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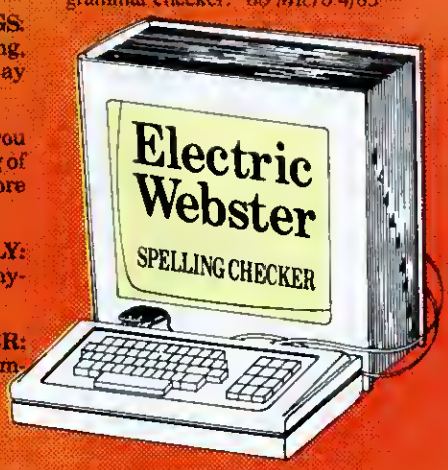

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The *80 Micro* Disk Series
(formerly Load 80)

The *80 Micro* Disk Series gathers together selected programs from this issue of *80 Micro* and puts them on a magnetic medium for your convenience. It is available on disk and runs on the Models I, III, and 4.

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Not all programs will run on your system. Some Model III programs, for instance, will run on the Model 4 in the Model III mode, but not in the Model 4 mode. You should check the system requirements box that accompanies the article to find out what system configuration individual programs require.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly disk subscriptions to The *80 Micro* Disk Series are $149.95. Individual loaders are available on disk for $17.95, including postage. To place a subscription order, or to ask questions about your subscription, please call us toll free at 1-800-343-0728 between 9 a.m. and 5 p.m. Or, you can write to The *80 Micro* Disk Series, 80 Elm St., Peterborough, NH 03458.

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Time Stamp
Article: Caught in a Time Stamp (p. 65).
System: Model 4, 64K RAM; Models I/III with changes.

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Language: Basic.
Filespec: TRSSTAMP/BAS.

Quick Comparison
Article: A Quick Comparison (p. 69).
System: Model 4, 64K RAM, TRSDOS 6.2, Pro-Create editor/assembler (optional); Model III, 48K RAM, LDOS 5.x, EDAS editor/assembler (optional).

Compare Plus lets you display two text files simultaneously and compare them line by line.
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Article: Data-Statement Generator (p. 80).
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Article: Strip Your TRSDOS (p. 84).
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Pop-Up Printer Codes
Article: The Next Step (p. 103).
System: Model 4, 64K RAM, editor/assembler (Pro-Create 4.3a or MRAS), Pro-Wam.

Use Pro-Wam pop-up utilities to access your printer's special features, such as double-strike mode and changeable fonts.
Filespecs: PRSET/ASM, MACLIB/ASM.

Checksum
Article: How to Use *80 Micro* Program Listings (p. 116).
System: Models I/III/4, 32K RAM.

Use our checksum program to check the accuracy of the Basic listings you type in.
Language: Basic.
Filespec: CHECKSUM/BAS.

BAS = Basic, ASM = source code, CMD = object code

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80 MICRO Review, November 1985

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System requirements - IBM-PC Compatible: One disk drive, 128K memory, color or monochrome monitor, and DOS 2.0 or higher.
TRS-80 Model 1/3/4/4D/4P: One disk drive and 48K memory.

Games That Once Were

You newcomers to Tandy computers might not believe it, but there actually used to be a market for TRS-80 games. That was before low-end computers with color and higher-resolution graphics siphoned off all the game players and relegated the III/4 to a dark street where only serious users dwell.

In the halcyon years—from around 1980 to 1983—*80 Micro* took its games seriously. Game-playing was part of the staff's daily routine. We even once took a day off for a game decathalon.

The readers were as enthusiastic. Our annual games issue was the most popular of the year. We featured a monthly column called The Gamer's Cafe and were deluged with entries for our one-line game contest.

I stopped playing computer games when the TRS-80 game market went down the tubes. I'm sure my waning interest had something to do with maturity (one of the hazards of growing older). But also, I didn't like the fancier games that ran on the Apple, Commodore, and IBM machines.

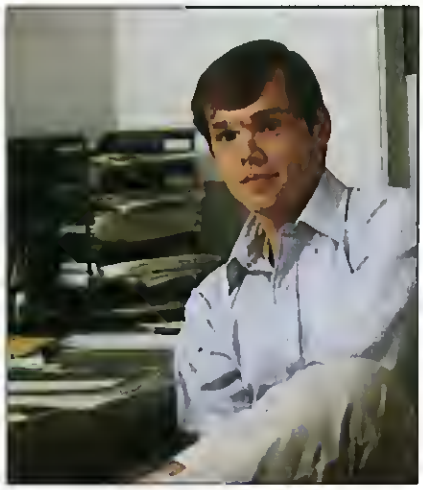
Stripped to their essentials, all arcade games are the same. You control a clump of pixels that try to avoid or hit other clumps of pixels. You can call these clumps space ships or swamp monsters. You can make them move faster or slower. You can give the player different rewards for his dexterity. But they're still nothing more than glowing, moving phosphors.

Minimalist Gaming

TRS-80 games were closer to the pure essence of gaming. The machine's graphics weren't good enough to give you anything more than abstract representations of objects. A space ship didn't look like a space ship—it looked like two or three rectangles stuck together. You only knew it was a space ship because the program's author told you so. The rest was up to your imagination.

Games these days come with entire manuals that you have to study before you can play. The best TRS-80 games had one line of on-screen documentation: "Arrows to move, spacebar to fire." After that, you were on your own, learning the game's weaknesses, honing your maneuvering skills, and practicing your shot until you became good enough to make the high-score board.

80 Micro's one-line game contest in



1983 demonstrated the wonderful simplicity of TRS-80 games. In a quarter-K of Basic code, programmers wrote games that had all the elements of a 20K assembly-language program. I still occasionally boot one up. My favorite is a Model III Cram-like game called Snakearound, which you'll find in the Program Listing.

Arcade Archives

Of the 100-plus Model I/III games I collected, my favorite was Big Five's Galaxy Invasion (the original, not the Plus version). GI was typical of so many TRS-80 games. Rows of battleships swooped from the top of the screen and you shot them. There was a time when my sole object in life was to reach 1 million. I finally did it one Saturday afternoon. GI had no pause key, so it took me seven non-stop hours. the game ended in disappointment—at 1 million, the score counter simply started over. No flashing messages, no bonus points, no recognition of the achievement.

I also liked Adventure International's Armored Patrol, certainly one of the most surreal computer games ever made. You were the commander of a tank, the screen serving as your window. Your object was to fight enemy tanks in a flat, barren wasteland rimmed by craggy mountains (it looked a bit like parts of Utah). The landscape was dotted with houses that you couldn't drive or shoot through. Of course, you also had to fight off energy-sucking robots from outer space. And every once in a while something odd would happen, like one of your shots disappearing over the horizon and suddenly whizzing past you from behind.

Armored Patrol was a tough game until a reader notified us of a fatal bug. If you put your tank at a certain spot, the robots would come straight at you and let you mow them down. We leaned a coffee cup on the spacebar and broke the office record by 200,000 points.

Blasts from the Past

Other games that were hits at *80 Micro* included Swamp War from Instant Software, Bable Terror from Funsoft, Eliminator from Big Five, and Sea Dragon from Adventure International. We've only added a few to that list in recent years. A Model II game called Wormy caught fire for a while until we ran out of room for the Model II. And Rapidynamic Software put out a cute little Model 4 game called Dog Catcher (Rapidynamic was the only company I know of that produced arcade games for the high-resolution board).

The TRS-80 was as suitable for games as a bus is for drag racing. But then, that was part of the I/III's appeal—making it do something it wasn't supposed to do. Too bad people can't stay satisfied with the simpler things in life; TRS-80 games might be more than just dusty bytes on a shelf.■

Program Listing. Snakearound.

```
10 N=128:F=16:X=64:Y=24:CLS:FORT=1TON*N:SET(RND(127),RND(47
));A=(PEEK(14400)AND120)/4:F=-(A=8)*F+A:D=FAND6:C=(FAND24)/
4:X=X+C+3*(C>0):Y=Y+D+3*(D>0):X=X+N*((X>=N)-(X<0)):Y=Y+48*(
(Y>47)-(Y<0)):IFPOINT(X,Y)CLS:PRINT"SCORE:"PELSESET(X,Y):P=
P+1:NEXT
20 REM SNAKEAROUND BY BILL PETERS
25 REM 2470 CAMELBACK ROAD, SALT LAKE CITY, UT 84121
30 REM ARROW KEYS TO MOVE--AVOID OBSTACLES AND YOUR TRAIL
40 FROM NOVEMBER 1983 80 MICRO
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End

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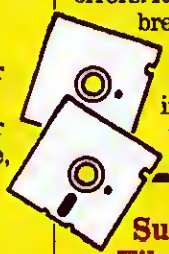

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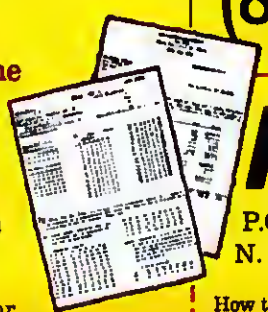

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A documentation update describes all new features and utilities, and contains technical information changes and additions.

Since this is an update to TRSDOS 6.2, all customers are expected to have purchased or received and have in their possession a legitimate copy of the TRSDOS 6.x DOS and documentation.

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The Latest on TRSCross

While we appreciate David Engelhardt's four-star review of our product, TRSCross (February 1987, p. 98), we want to clarify a few points.

Mr. Engelhardt reported that TRSCross does not convert Basic programs accurately. We do not claim 100-percent conversion accuracy. We have, however, improved the accuracy of our later versions of TRSCross, the current version being 1.30.

Mr. Engelhardt also reported that you must convert Superscripsit files to ASCII format before TRSCross will accept them. Although our early advertisements and manuals stated that you had to perform the conversion, we removed the restriction before we introduced the program. TRSCross is, as far as we know, the only program on the market that performs the conversion automatically during a copy.

We found that the additional conversion step that Mr. Engelhardt stated was necessary to convert Model 4 disks is only required with TRSDOS versions older than 6.2.1.

Dennis Brent, President
Powersoft Products
Dallas, TX

Checking Out Memcheck

I read Mark Goodwin's review of our Memcheck utility (February 1987, p. 101) with great interest. I want to correct a few misunderstandings regarding the program.

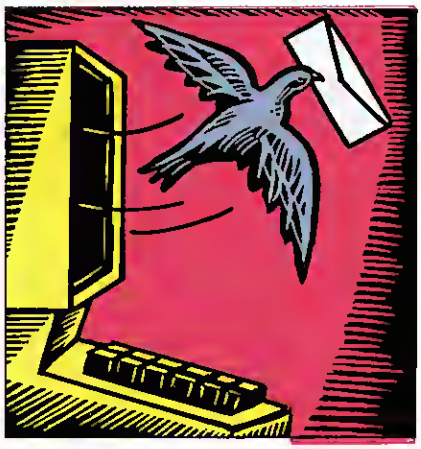
Mr. Goodwin assumed that a computer's memory is installed by a technician. Many less-qualified people are trying to save money by installing their memory boards themselves and often encounter problems soldering the connections. Memcheck can help these people find the bad connections.

Mr. Goodwin claims that once you correct the connections, you will not have further use for Memcheck. Hardin Brothers pointed out in his review of Supermem (January 1986, p. 35) that moving a computer that has memory upgrades can loosen connections to the main memory board. If this happens, you will be glad to have a diagnostic utility like Memcheck on hand.

I regret that I neglected to note in the Memcheck documentation that the utility is only compatible with the Alpha Technology Supermem expansion. Mr. Goodwin tested it with a Seatronics upgrade.

We have released a revised version of Memcheck that only supports memories of 256K or more using Alpha Technology's Supermem upgrade. The new version is faster and should correct the problems of the earlier version.

Michael Snyder
RSI Software/
Rattan-Snyder Investments
Deltona, FL



Stepping Out

Would you consider publishing a compendium of Hardin Brothers' The Next Step column? I am sure that many of your readers refer to the columns as often as I do and would appreciate such a convenience. I would also be grateful for a series of articles (not reviews) on LS-DOS 6.3 and LDOS 5.3.

R. Hollenbeck
El Paso, TX

We have no plans to compile Hardin's columns, but we do have material on LS-DOS 6.3 and LDOS 5.3 in the works.

80 Micro's BBS is open 24 hours a day. It offers programs you can download, special-interest groups, and a classified section. You can reach the board at 603-924-6985; UART settings are 300/1,200 baud, 8-bit words, 1 stop bit, no parity.

Emulator Boards?

In your Side Tracks column of November 1986 (p. 8), you mentioned that several manufacturers are considering making a Model 4 emulator board for MS-DOS machines. We have over 1,000 Model I/III/4 programs and hope to avoid the task of converting them to MS-DOS. Please keep us posted.

Robert Ledee, Treasurer
Orange County TRS-80 Users Group
Lake Forest, CA

Warehoused Wonders

In the February 1987 issue, you said that Multidos is no longer available (p. 96). Diskcount Data advertises Multidos on p. 2 of the same issue.

Robert Hales
Albion, NY

Thanks for pointing out our mistake.—Eds.

Continued Support

I have renewed my *80 Micro* subscription because my Model III is being supported less and less as MS-DOS machines continued to gain popularity. My Model III does what I want, and I see no reason to upgrade.

George Phillips
Sun City, AZ

Printer/Typewriters?

I have seen several new typewriters in office equipment and department stores that can be interfaced with computers and used as printers. I have not, however, seen any mention of these machines in *80 Micro*. Would you consider publishing an article or series of reviews focused on printer/typewriters?

Gerald Siegfried
Reading, PA

Early printer/typewriters were slow and expensive. Perhaps it is time we took a look at what's available now. Thanks for the idea.—Eds.

Send your correspondence to Input, 80 Micro, 80 Elm St., Peterborough, NH 03458. We reserve the right to edit letters.

Illustration by Anthony Russo

Send your questions or problems dealing with any area of Tandy/Radio Shack microcomputing to Feedback Loop, 80 Micro, 80 Elm St., Peterborough, NH 03458. Please include a self-addressed, stamped envelope and daytime phone number.

What a Character

Q: How can I use the European characters of my DMP 200 printer with Disk Scripsit on my Model 4P? *(Klaus P. Winter, Fort Worth, TX)*

A: The best way to access these characters is to use a word processor that supports extended codes. Both LeScript and Superscripsit support user-defined character codes. Another way is to use Clifford Knight's Scripaid program ("Model 4 Scripsit the Write Way," January 1985, p. 60), with which you can assign control codes to output desired characters on Model 4 Disk Scripsit.

Printer Support

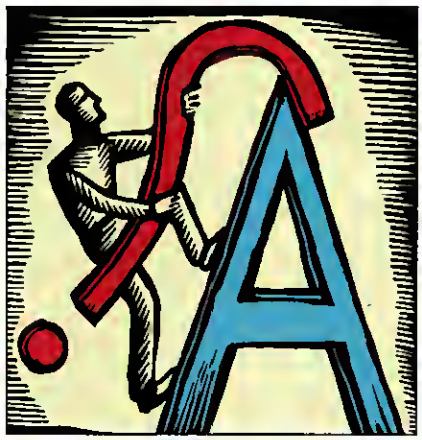
Q: Loading Superscripsit into my Models 4P and 4D somehow eliminates any print-mode commands to my printers (an Okidata 82A and a Gemini 10X). I cannot use the double-width, condensed print, or any other modes on either printer. I contacted the printer manufacturers and the printer-driver company. They all tell me that there is something in Superscripsit that overrides my commands for changes in print mode. Since I use these machines to prepare manuscript materials, this is a serious problem for me. *(George Manolakes, Westfield, NJ)*

A: You can alter Dan Robinson's "MX-80 Driver" (May 1983, p. 125) to support the Gemini 10X and 15X printers with changes that Kenneth D. Grimm provided in the April 1984 Reader Exchange (p. 30).

Out of Control

Q: I have Superscripsit 1.01.00, and a DMP 130 printer. Occasionally, when I am typing a document, the program spews a jumble of words onto the screen. Another peculiar thing is that sometimes the printer starts feeding the paper backwards when I try to print a document. Each new line prints above the last.

The printer also seems stuck in elongated print mode when I use Superscripsit. I have the user keys programmed to



change type modes. Clear-shift-1 is the command to change the modes. If I don't use it when I call a document or create a new document, the characters print in elongated mode. *(Robert Rowe, Port Charlotte, FL)*

A: Are you using the DMP130/CTL driver with Superscripsit? It is available to registered Superscripsit owners at no charge from Radio Shack (catalog no. 700-2294). If you are, your copy of Scripsit or one of its support modules might be defective. You can go to Radio Shack with your original disks and copy the files from one of the store's disks onto yours to ensure that the software is not the problem. (The latest version is 1.1.3—check Radio Shack's update book if you have an older version.)

You should also run a memory-test program to ensure that you do not have a faulty RAM chip. Memtest/CMD on the TRSDOS 1.3 system disk should do the job. If these methods do not reveal your problem, check your cable connectors for corrosion. Use a pencil eraser to clean the contacts.

Be careful not to accidently hit the control key or type too fast. If you type very fast, the TRSDOS 6.x keyboard driver might interpret a multikey combination as another single-key code or a control sequence. Similar problems arise if you accidently hit control.

Escape from NLQ

Q: I am using Superscripsit with a Model 4P and a DMP 130 printer. I often want to print without using the near-letter-quality (NLQ) mode because it is slow. There is no option in Superscripsit to disable NLQ. Can you tell me how to do it? *(W.M. Staudenmaier, Wakarusa, IN)*

A: One of the easiest ways is to use a printer driver that supports a printer without NLQ mode, such as the DMP 120 driver. Such a driver does not support separate data- and word-processing modes. Your DMP130/CTL driver is automatically setting up your printer for NLQ each time you select a manuscript task.

No Access

Q: I have Scripsit for the Model I, which I have converted to run on my Model III. I can run it on my Model 4 in Model III mode, but I can't get it to print on my Okidata Microline 80. *(Delbert Roberts, Mason City, IA)*

A: If you have simply copied Scripsit/LC from the Model I disk to your Model III disk, the program runs but cannot access the printer ports. You must convert all sequences of 32E837 hexadecimal (hex) to D3F800 hex within the program.

Model I Scripsit sends all data out to its printer-interface address at 37E8 hex, but Model III sends data to the printer via port F8 hex with the command OUT (F8H),A.

Put C9 hex at address 4203 hex to prevent the break vector from crashing the program.

Address Change

Q: I have a copy of the Radio Shack Assembly Language Tutor on tape and am trying to use it with my 48K Model III and four Tandon double-sided disk drives.

The program works fine on tape, and I have successfully converted the first part to disk with TRSDOS 1.3's tape-to-disk utility. I cannot, however, copy the rest using either TRSDOS or Basic. The program works in Level II Basic, but it loads as ALTC/CMD in TRSDOS. When I try to run it, it immediately reboots TRSDOS.

I've unsuccessfully tried to load the other parts of the tape into Disk Basic. In TRSDOS, the Tape function starts, but gives me an error 11 (illegal function call). If I try to load ALTC/CMD file from Basic, I get the message "Direct statement in file."

Can I convert this program to disk? I have a hunch that it occupies the same place in memory as TRSDOS. *(Ron Folkert, Benton Harbor, MI)*

A: It looks like the program operates in the DOS area (4000–41FF hex) or con-

Illustration by Anthony Russo

Circle 282 on Reader Service card.

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DMP 2200	(1279)	1152.00	BELTRON Computers	XT A-1 256K-1.D.D.	428.00
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DWP 520	(2800)	685.00	NOT TANDY COMPATIBLE	XT P-1 256K-1.D.D.	444.00
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tains code within that area. To load it from a DOS disk, you must relocate it to a higher memory address, out of the way of DOS. That way, the program does not overwrite the DOS when it loads. You must append a small subprogram that disables DOS, loads the program down into its operating environment, and executes it as though it had been loaded from tape.

Newdos/80 has a program called LMOffset, and LDOS has one called CMDFile, both of which do those operations for you.

Hung-Up on Fortran

Q: Our high school recently purchased Fortran IV from Radio Shack. I use the TRSDOS 6.2.1 operating system. Logical variables do not seem to work. The computer hangs up, and I can't do anything except reset. Can Fortran sort strings easily and effectively?

When I format my read statement as A4 hex, it sorts on the fourth character (A8 hex sorts on the eighth character). I'm sure the routine is correct. Can I add Set, Reset, and Point to Model 4 Basic? Is there a graphics sheet for the Model 4? *(David Meier, Reedsville, WI)*

A: Where are you getting your samples and instructions for logical variables? Most instructional materials and tutorials are geared toward Fortran 77, whereas the Radio Shack (Microsoft) version is an implementation of Fortran IV. Make sure to set up your logical operations to satisfy your compiler's requirements. I have not had problems working with logical operators.

String manipulation in Fortran is possible, though difficult. Fortran was primarily designed to solve complex mathematical equations, not to manipulate text strings. Strings are better handled by such languages as Lisp and Basic.

You can regain Set, Reset, and Point on the Model 4 by using Alan D. Smith's program in "Upgraded Graphics" (August 1985, p. 76). There is a sample graphics sheet in appendix G of the Model 4's *Disk Systems Owners Manual* for TRSDOS 6.x. Note that you can break each block into six pixels.

Date Update

Q: I use a Model 4D with Deskmate and TRSDOS 6.02.01. I am distressed that the only sign-on dates allowed are from Jan. 1, 1980, to Dec. 31, 1987. Is there a patch to disable the check of validity of the year, even if it means calculating the wrong day of the week? I keep records on Deskmate and am concerned about maintaining my sequence of date references in the directory after 1988 begins. I also write programs in Basic and want to keep track of my program updates with the directory. *(Thomas McClellan, Fort Worth, TX)*

A: A new version of TRSDOS, called LS-DOS 6.3, is available from Logical Systems Inc. (LSI), P.O. Box 55235, Grand Junction, CO 81505, for $29.95. Unfortunately, a patch to TRSDOS 6.2.1 is not enough. To make room for the new dates from Jan. 1, 1988, through Dec. 31, 1999, LSI removed the user password. LS-DOS 6.3 date- and time-stamps files when you create or update them.

Out of Line

Q: I use Superscripsit 1.3.1 on a Model III. If I adjust the margins after opening a file and then print out text that is supposed to be justified left and right, the first line of each paragraph prints ragged right. How can I correct this? *(Gideon Oren, Milwaukee, WI)*

A: I duplicated your problem by assigning the pitch setting in the Open Document Options field to a value other than P, such as 10 or 12, which indicates monospace mode rather than proportional spacing. I then made sure that the method of justification in the Print Text Options field was set to P for proportional spacing.

The odd justification in the first line is due to a conflict between the two settings. If your printer can do proportional space printing, then change the open-document option to P. If it cannot print proportional spaces, then set the print-text option setting to M for monospace printing.

You can set these options to user-defined defaults by going to the system-setup menu from the main menu when you first enter Scripsit. You must set the print-text option to M if you use the specified-pitch-value setting. The print-text option must be P if you use proportional spacing.

Scripsit Indent

Q: Resetting the paragraph-indentation parameter each time I use Model III Disk Scripsit is boring. What patch sets the default indentation? *(Richard Yoder, Redding, CA)*

A: Scripsit sets the paragraph indentation during initialization. The following are patches for the Model I/III/4 versions of Disk Scripsit:

For the Model I running TRSDOS, use the Program Listing. For Model I LDOS, use:

```
PATCH SCRIPSIT/LC (D=00,B1=00)
```

For Model III Scripsit, use:

```
PATCH SCRIPSIT/CMD (ADD=5373,FIND=05,CHG=00)
```

For Model 4 Scripsit, use:

```
PATCH SCRIPSIT/CMD (D00,C8=00:F00,C8=05)
```

Change the 00 assignment value to any hex value you want from 00–84 (zero–132 decimal).

Incompatible Keys

Q: As a relatively new Tandy 1000 user, I am still learning much about this fine computer. I use many PC-compatible programs that the 1000's keyboard does not seem to fit. Can I use another PC-type keyboard with the 1000? Can I use another PC-compatible mouse with the 1000 instead of Tandy's? *(Mike Bean, Fayetteville, AR)*

A: Most keyboards designed for the IBM PC do not work on the Tandy 1000. However, you can temporarily redefine the incompatible keys with the ANSI.SYS extended-screen and keyboard driver. The *Tandy 1000 Programmer's Reference Manual* (catalog no. 25-1503), appendix A, describes how to do it.

You can use a PC-compatible mouse driven by the serial port.

Superscripsit System Files

Q: I own a Model III and a Model 4. A few months ago, you listed the functions of all the Model 4 system files (January 1987, p. 70). I found the list very helpful. Please do the same for the Model III Superscripsit files. *(Don Johnson, Carson City, NV)*

A: Model III Superscripsit 1.3.x, is almost a reflection of the current Model 4 version. The disk files that Tandy supplies fall into four groups. The first group is the Superscripsit program and its overlays. The second group holds the printer drivers, such as DW2/CTL, DMPxx/CTL, and S/CTL. The third group comprises document files without extensions, such as Demo100, Catalog,

Program Listing. Model I routine to set paragraph indentation for Scripsit running under TRSDOS.

```
10 'Model I Default Indent fix
20 FL$;eq"SCRIPSIT/LC" 'change to SCRIPSIT/UC if needed
30 OPEN"R",1,FL$:FIELD 1,1 AS 177, 1 AS T$
40 GET 1,1
50 LSET T$;eqCHR$(&H00)
60 PUT 1,1:CLOSE 1:END
```

End

Circle 17 on Reader Service card.

The Amazing A-BUS

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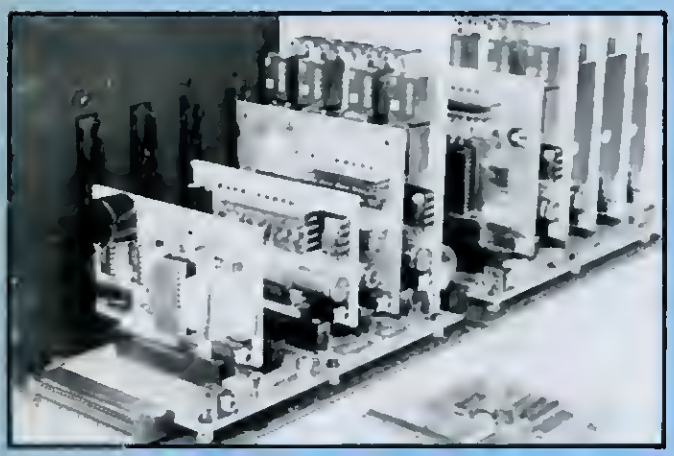

An A-BUS system with two Motherboards
A-BUS adapter (IBM) in foreground

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- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card — RE-140: $129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card — RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card — AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter — AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card — IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O — DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm — CL-144: $69

Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder — PH-145: $79

Each tone is converted into a number which is stored on the board. Simply read the number with INP or PEEK. Use for remote control projects, etc.

A-BUS Prototyping Card — PR-152: $15

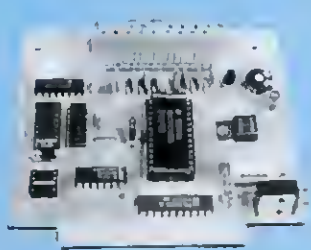
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s

ST-143

CL-144

RE-140

IN-141



AD-142

Smart Stepper Controller — SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option — RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option — PD-123: $69
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option — BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver — ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-161: $99**

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Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus"	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3, 4, 4D. Fits 50 pin bus. (With hard disk, use Y-cable)	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model 1. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot. Multipak, or Y-cable	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) — CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard — MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included

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and Lectures. The fourth group holds system support programs, such as the Install/BLD and Harddisk/JCL files, which configure the optional Superscripsit Dictionary disk and set up the system for operation on a hard disk.

The program core is Scripsit/CMD and its overlays. These fall into three groups: word processing, spelling checking, and word-processing system configuration. They are as follows.

- Scripsit/CMD: Remains resident at all times but reloads after you use the spelling checker, which overwrites parts of it.
- System/CTL: Stores the default and user-defined configuration formats, such as tab lines, user-defined keys, and custom printer codes.
- Help/CTL: Provides the on-line help option for the control keys. You can remove it.
- Errors/CTL: Displays Scripsit errors. This is a text file. The system won't crash without it, but errors will appear as incomprehensible garbage on the status line.
- Proof/CTL: A major portion of the spelling checker. You can remove it if you do not use the Scripsit Dictionary.
- Words/CTL: Stores user-defined words. Remove it if you remove Proof/CTL.
- SCR16/CTL: Handles headers, footers, tab settings, and block controls.
- SCR17/CTL: Displays the main menu and executes the other modules that support Scripsit. It also contains the directory-read function.
- SCR18/CTL: Handles file-format structuring.
- SCR19/CTL: Like SCR18/CTL, but also handles queries and compares. This and SCR18/CTL are the system's workhorses.
- SCR32/CTL: Handles block action commands.
- SCR33/CTL: Handles the global-find, delete, and replace commands. Contains the search and replace portions of the proofreading program.
- SCR34/CTL: Controls the ASCII conversion and compression utilities. You can remove it.
- SCR35/CTL: Displays the system setup menu and handles the verify-deletion function and the text-mode user-key-storage option.
- SCR36/CTL: Controls the rest of the system-setup functions, such as user-defined-key editing, printer codes, alignment, and character setting.
- SCR50/CTL: Support program for the proofreader. You can remove it.

Requesting Backup

Q: I have a Model 4 with a hard disk. How can I back up the hard disk to floppies? *(Darrell A. Sherrin, Kelowna, BC)*

A: The Radio Shack Hard Disk Utilities has a back-up feature. Also, Powersoft (17060 Dallas Parkway, Suite 114, Dallas, TX 75248, 214-733-4475) has a back-up program (Backrest, $99.95) that is more flexible and faster. If you just need to back up a few data files, use the TRSDOS Backup command.

More Superscripsit Tips

Q: I am using Superscripsit 1.00.01 with TRSDOS 6.01 on a Model 4 and have access to three printers: the DMP 420, 120, and 105.

My first question concerns using the block-action print command in a multipage document. Due to poor typing and screen proofreading, I frequently find an error in a document after I have printed it, and, invariably, the error is on page 2, 3, and so on. I correct the error, block the page, press B for block-action, P for print, and enter when the print options appear, and the page is printed. The problem is that the printer feeds blank pages until it gets to the blocked page—a waste of paper. Is there a way to prevent this?

My second question concerns using the underline command with the superscript and subscript commands. I teach algebra and prepare my tests with Superscripsit. If I don't stop the underline before issuing the superscript command, the underline appears under the exponent. If I stop the underline before the superscript command and begin it again after subscript, I get a blank space in the underline. How can I continue the underline without the break? *(Dick Breaktron, Myrtle Beach, SC)*

A: Superscripsit 1.01.00 is an upgrade of 1.00.01 that fixes the page-feed problem. You should have been notified of a free upgrade by Tandy if you sent in the Superscripsit registration card. If they missed you, consult your local Radio Shack computer dealer.

The fastest solution to your second problem is to set up a special printer code. From the initial Superscripsit menu, select S (system-setup utility) and from that menu select C to enter printer codes.

Assume you want to use the numeral 9 as the special indicator. Use the down-arrow key to align yourself with the first space of the units column after "9," type zero, and press the down arrow once to get to the sequence column. Type 27,28,8, 95,27,30. Press the down arrow again, type BACKLINE, press the enter key twice, then press the break key. You are now back at the main menu.

Whenever you type a document, after each superscripted character under which you want to print the line, press the clear key (producing a copyright symbol) followed by the 9 key.

The 27,28 sequence performs a half-line feed, 8,95 backs up the printer head and types an underscore character, and 27,30 performs a reverse half-line feed, returning you to your previous position. Check the printer manual for the proper codes.

Readers Respond

Thomas R.W. Longstaff (Waterville, ME) offers a fix for the extra line feeds that printers configured for use with older Tandy computers insert when used with PCs and newer Tandy machines. As Mr. Longstaff explains, the line feeds occur because Tandy computers and software expected printers to supply a line feed with each carriage return. His fix is for the Radio Shack Line Printer VI.

"To disable the unwanted extra line feed, I use the following technique:

- Unplug the printer and remove the knob at the right end of the platen (do this by removing the small screw in the center of the knob and gently sliding the knob off).
- Remove the tractor feed, paper bail, cover, and the gray case that encloses the mechanism (do this by removing seven screws, two at each side, two at the back and one inside the printer cabinet at the front center, and lifting off the case).
- Find the small block with four DIP switches at the back of the mechanism where the printer cable connects. The second switch controls line feeds. When the switch is open, the printer generates a line feed with each carriage return. Close the switch to disable the line feed.
- Reassemble the printer. You must reactivate the line feed to use the printer for graphics."

Seeking Help

►Michael D. Scheehle (19 Oak Meadow Court, Charlotte, NC 28210) is looking for the PFS:File program for the Model III. Radio Shack is unable to supply it and Software Publishing Corp. no longer supports the PFS series for the Model III.

►Wilson Fletcher (4117 Bird Drive, Erie, PA 16510) is looking for a Model 4P Modem Board (catalog no. 26-1084). Radio Shack has discontinued it.

►Julius Gianakos (P.O. Box 993, Peoria, IL 61601) is looking for instructions on how to add his Shugart 801 drives (8 inch) to his Model I with a double-density controller, LDOS 5.1, and 5 1/4-inch drives.

►S. Goldhor (1014 B St., Hayward, CA 94541) is looking for a schematic of the Holmes disk-controller board for the Model III. He needs information on setting the board's DIP switches. ■

Circle 378 on Reader Service card.

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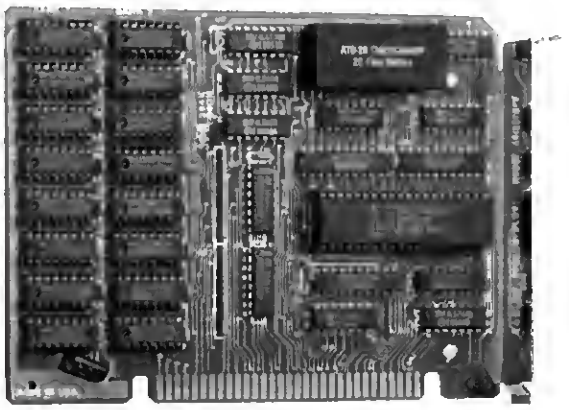

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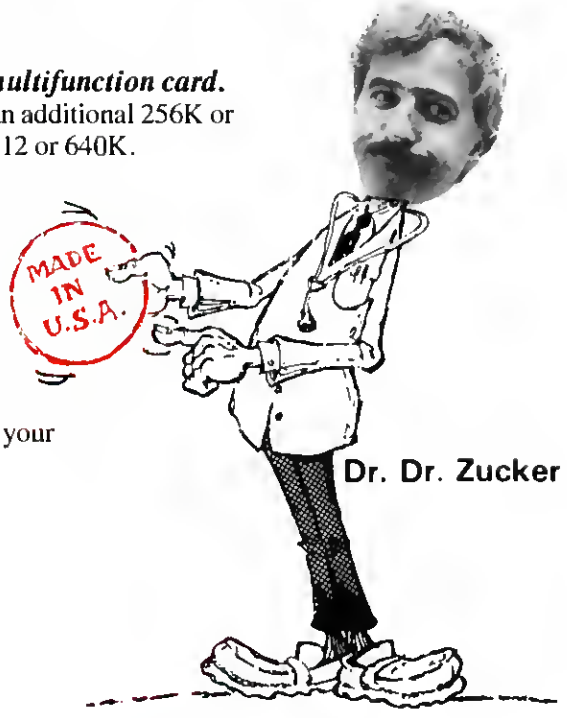

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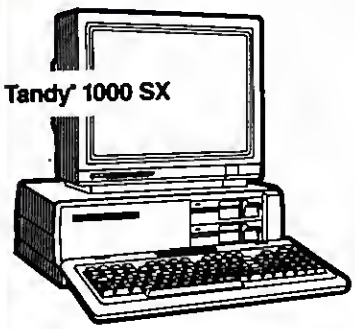

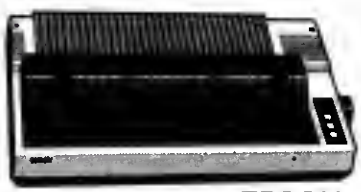

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	DMP 430 (26-1277)	498.00
	DWP 230 (26-2812)	294.00
	DWP 520 (26-2800)	698.00
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	XT A-2 640K, 2 D.D.	585.00
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TRSDOS's Bittersweet Reality

Tandyland

Poke a dedicated Model I, III, or 4 owner and you'll find a self-reliant individualist who is not given to following fads. When the fad turns into a monolithic standard, however—and who nowadays doesn't know that means IBM compatibles and MS-DOS—you wonder how long even the most stubborn devotee can hold out. Do Tandy's 8-bit machines have any future?

I asked a handful of people closely involved with the TRS-80 hardware and software business for their impressions of the patient's health. The consensus seems to be that the TRS-80 line looks remarkably well for an old coot who can only do a few things as well as his youthful counterparts, but the retirement home can't be far away.

Even when it was introduced in 1983, the Model 4 was seen as a last gasp for the TRS-80 line.

Missing from most debates about TRSDOS's fate is an appreciation of its continued usefulness to thousands of satisfied customers. Bill Schroeder, president of Colorado-based Logical Systems Inc., the original developer of TRSDOS 6.x, said businesspeople and the media are so eager to jump on the latest bandwagon that they tend to dismiss older technology long before the public is ready to give up on it. "We are guilty of trying to prod them into a new computer when they don't need one," Schroeder said, later adding, "The users have a lot less gloomy picture of their situation than we try to paint for them."

It's hard to know how many people actively use TRS-80s. Recent figures from International Data Corp., a market-research firm, estimate the installed base of the Model 4, 4P, and 4D alone to be 325,000 worldwide. Tandy still sells somewhere between 500 and 4,000 Model 4Ds a month.

The handful of remaining software firms continue to sell enough TRSDOS software to avoid having to drop it for a total commitment to MS-DOS. Roy Soltoff, president of Misosys Inc. in Sterling, VA, said he sold 600 units of TRSDOS 6-compatible LDOS 5.3 between Jan. 5 and mid-February, and he expects to sell 5,000 by the middle of next year. In February, Soltoff released eight utility programs, some of them repackaged products acquired from Logical Systems in a marketing deal. Sales of Schroeder's LS-DOS 6.3, which Tandy supports through letters to registered Model 4 owners, could reach 100,000 units by fall 1988, and Schroeder might release upgrades of existing utilities if the demand warrants.

User's groups and Compuserve's TRS-80 special-interest group (SIG) remain active.

According to Wayne Day, a sysop (system operator) for the SIG, "In general, I'd say that there's a very active and dedicated core of folks that are still using the TRSDOS machines, but some of them seem to be leaning towards the MS-DOS world."

In addition, TRS-80 users continue to represent the largest proportion of *80 Micro* readers. In a reader survey last year, the Models I, III, and 4 filled three of the top four positions in a ranking of computer ownership. The users are out there, but they are getting increasingly worried whether any company—including Tandy—will support them.

For their part, Tandy officials insist they plan to provide service to TRS-80 owners indefinitely. Spokesperson Fran McGehee said Tandy will keep the Model 4D "in the line" but has no plans to introduce any new hardware or software. She emphatically denied rumors that the company has plans to introduce a Model 4 upgrade.

The $1,199 price tag on the Model 4D has some people wondering about Tandy's commitment to this machine in a time when many IBM compatibles are selling for hundreds of dollars less. (Tandy's own successful clone, the 1000 SX, is priced at $999 without a monitor.) "How are they going to sell it?" Soltoff asked, adding that the remaining Model 4 business may consist mostly of residual sales to schools and businesses that already own several of the machines. Schroeder said, "The Model 4D should be $699–$799. You practically have to hog-tie the salesmen to get them to sell you one."

In a rare interview last July, Tandy Chairman John Roach shared his thoughts on the TRS-80 line with Jan Lewis in the *Computer Insider* newsletter. When Lewis asked why Roach referred to TRS-80 in the past tense, he replied, "Well, we continue to sell those kinds of machines, but there will be a minimum of new products offered in those lines. Our primary thrust is in the PC-compatible, MS-DOS world."

Where does that leave users? With perfectly utilitarian machines they can probably have fixed at Radio Shack, and for which practically no new software will be written in 1987 and beyond.

Schroeder has a formula he uses to gauge the health of the TRS-80 market, which today essentially involves only the Model 4. With a minimum of 250,000 computers in active use, a secondary market tends to support itself through magazines, mail-order retailing, and advertising. If a few more of those 250,000 end up in closets, however, the "critical mass" is lost and the secondary market dies.

Schroeder said he fears the Model 4 may slide past the point of no return this year, but he still wants to focus on its good points. "You can buy a used one dirt cheap, there is good existing software that is cheaper than IBM software, and it contains good, refined hardware. There are many strong points."

Dennis Brent, president of Dallas-based Powersoft, agreed with Schroeder's grim prediction for 1987, saying this is probably the last year for TRS-80 software developers to introduce new products. But, he said, "We're not jumping into MS-DOS with both feet. . .The Model III/4 is an excellent computer. . . We're still going to be here, and we will support you."

In a cost-cutting move, Tandy began converting 106 of its 490 Radio Shack Computer Centers (RSCCs) to Plus Computer Centers starting Feb. 1. The new Plus Centers will still carry the full line of Tandy computers but will not have training or repair service. Tandy will transfer "outbound" salespeople working with business accounts to nearby RSCCs.

Ed Juge, Tandy's director of market planning, said the need for business-oriented stores has diminished with the growth of the outbound sales force, now estimated at 1,900 nationally. "We expect the net result of these changes to be improved coverage for walk-in customers," Juge said. "Customers served by the outbound sales organization should notice no difference. Conversion should also result in cost savings to Radio Shack."

Tandy closed down 24 stores completely and established Plus Centers in nearby Radio Shack retail stores but had no plans to lay off employees, according to another spokesperson.

If sheer quantity is what impresses you, consider that in 1986 Tandy spent an estimated $8.7 million on print advertising alone, compared with $4 million the previous year. Now consider that Tandy's budget is dwarfed by others in a list of 8,950 high-tech advertisers topped by AT&T, which spent $60 million on 3,556 pages of advertising in 92 publications last year. And I haven't mentioned television and radio.

The latest semiannual HiTAP (High Tech Ad Placement) report from C Systems Ltd. of Ridgefield, CT, shows that Tandy placed more ad pages in *80 Micro* than in any other publication. One hundred forty-two Tandy pages costing an estimated $592,000 appeared here; in second place was *Rainbow*, with 42 pages worth $88,000. Page counts don't tell the whole story, however. In dollars, a page in *80 Micro* is to a page in *Business Week* what a used, low-mileage Honda is to a shiny, new BMW. *Business Week* was thus the chief beneficiary of Tandy's promotional urges, carrying 30 pages worth an estimated $1.18 million. The *Wall Street Journal* followed, with 29 pages at $986,600.

The total number of pages taken out by the companies included in the HiTAP report was down about 9,000 from the previous year's total of 160,000. Expenditures, however, rose about 6.6 percent to $1.28 billion.

Tandy's 595 pages in 48 publications may seem piddling next to those of AT&T or second-place IBM, which ran 2,173 pages worth $44 million in more than 70 periodicals. Xerox, Hewlett-Packard, and Compaq all spent more than Tandy. But $8.7 million is more than many companies take in all year, giving us an idea of just how big the big players are. (Tandy said that its advertising expenditures for fiscal 1986, including print, television, radio, and catalogs, totaled $221.2 million.)

According to predictions, microfloppies will become standard replacing the 5¼-inch disks by 1989.

Update

A May 1984 Pulse Train report rhetorically asked whether 3½-inch floppy disks would someday replace 5¼-inch disks as the standard storage medium for microcomputers. Now, after three years of technology's inexorable march comes the answer: probably.

Disk/Trend Inc., a Los Angeles based market-research firm, predicts so-called microfloppies will become standard by 1989. Quoted in *Infoworld*, Disk/Trend Vice President Robert Katzive said IBM will lead the trend this year by putting smaller drives in its long-awaited "clone-buster" PCs. Meanwhile, disk and drive developers will introduce products offering several megabytes (MB) of storage—on disks of both sizes—for use with higher-powered machines.

Projected 1986 sales of 3½-inch drives were up 71 percent over the 3.3 million units sold the year before. The number could rise to 14 million units by 1989, according to Disk/Trend. Already, microfloppies account for 26 percent of the floppy-disk market. What are the benefits?

For one, smaller drives are helpful in producing "small-footprint" PCs designed to economize on desk space. Metal sleeves protect the disks themselves, reducing the likelihood of data loss. And there are substantial gains in storage capacity.

Toshiba America Inc. of Tustin, CA, has begun showing a prototype of a 4MB microfloppy drive to original-equipment manufacturers (OEMs), according to *Infoworld*. The drive could go into production in 1988. Mountain View, CA, based Kao Corp. of America is testing microfloppies that hold up to 7MB.

The technology for 5¼-inch disks isn't standing still either. Kao Corp. and several other companies are working on floppies with capacities as high as 50MB, and Konica Technologies Inc. of Sunnyvale, CA, has released a floppy-disk drive that could appeal to current users of low-capacity hard disks.

"When" has now replaced "if" as the operant word.■

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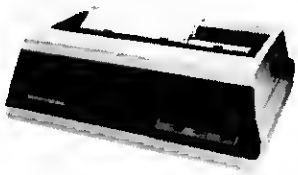

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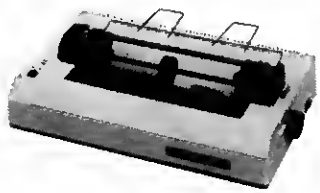

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Recovering "Lost" Memdisk Files

If you accidentally press reset and wipe out your Memdisk, you haven't really lost the files there. Just repeat the Memdisk initialization:

```
SYSTEM (DRIVE=n,DRIVER="MEMDISK")
```

Do not, however, format the Memdisk. A directory of the Memdisk drive should show that all your files are still there.

Mark Hershberger
El Dorado, AR

Using Shell18/CMD with LS-DOS 6.3

The public-domain, Model 4 DOS shell program, Shell18/CMD, doesn't work with LS-DOS 6.3. Attempts to execute it result in the message, "TRSDOS 6.2 is required for this program."

A simple POKE 133,98 from Basic cures the problem. This Poke might work with other programs incompatible with LS-DOS 6.3.

Bob Littlepage
Hattiesburg, MS

Newdos to MS-DOS Via Supercross

Powersoft's Supercross/XT III utility will not convert Model III Newdos/80 MU-type sequential files to MS-DOS format. According to Powersoft, Supercross/XT III only supports files created by TRSDOS 1.3's Open "I" statement and containing ASCII characters with each line ending in a carriage return. It moves that data to an MS-DOS disk and adds a line feed after the carriage return.

I did get around the problem, however. I changed one of my Newdos/80 file-maintenance programs so that it read the files into memory using its normal Disk Basic input/output (I/O) instructions and then wrote it back to disk using TRSDOS's Disk Basic sequential I/O instructions.

First, I replaced:

```
OPEN "O",1,"filespec","MU"
```

with:

```
DPEN "O",1,"filespec"
```

Then I replaced:

```
PUT 1,,,A!(I),A$(I),B$(I),C$(I),D$;
```

with:

```
PRINT#1,A!(I),K$,A$(I),K$,B$(I),
K$,C$(I),K$,D$(I)
```

You must also include the statement K$ = "," to serve as delimiters.

After I converted and transferred the original Newdos/80 programs that created and maintained the sequential files, I replaced the Put and Print# statements with Write# statements to automatically insert the delimiters.

Mark Morris
Pueblo, CO

Update: Loose-Leaf Listings

I've made some enhancements to Kenneth Frith's program (Reader Forum, February 1987, p. 25) that prints out listings for placement in loose-leaf binders. My version (Program Listing 1) pages past perforations, stops for single-sheet use, and lets you use different printers and operating systems.

Line 130 lets you indent the left margin to allow enough space for you to punch holes. Line 140 prompts for the type of paper you are using. If you use single sheets, the printer stops and waits for you to change the paper.

Line 150 sets the variable values for the indent and the number of dashes in the header and footer. It also places the date at the right of the header line.

By changing the date format in line 180, the program will work with any Model III or 4 operating system. For the Model III use:

```
LEFT$(TIME$,8)
```

For the Model 4 use:

```
DATE$
```

Line 180 also puts the date on page 1 only. Line 350 halts the printer when using single sheets. Line 410 skips perforations when using tractor-feed paper and advances to the top of form when finished printing.

Important variables are F, the number of dashes for the header and footer; P, the date placement; and ID, the number of spaces to indent the left margin.

M.H. Briggs
Walla Walla, WA

Program Listing 1. Utility to print out Basic listings for storage in loose-leaf binders.
See p. 116 for information on using the checksums.

```
100 ' Model III/IV version Up-grade of Kenneth
    M. Frith Basic Program Lister,
    by M.H. Briggs
110 CLEAR 300:CLS:O=1:DEFINT I-L  'CLEAR only
    for Model III                          '*  1973
120 PRINT" BASIC PROGRAM LISTER WITH HEADER AN
    D FOOTER, PAGE NUMBERS":PRINT          '*  5028
130 PRINT" Enter Left Margin Indent (ENTER=0)"
    ;:PRINT:INPUT ID:F=80:PRINT            '*  5332
140 PRINT" Tractor Feed Pages, or Single Sheet
     Feed (T/S) (ENTER=T)";:PRINT:INPUT H$:PRI
    NT                                     '*  6763
150 F=F-ID:P=79 'Limits number of dashes for u
    nderline and date placement            '*   880
160 PRINT" Enter Program Filename (ASCII only)
     ":PRINT:INPUT FI$                     '*  4895
170 OPEN"I",1,FI$                          '*   947
180 IF O>1 THEN LPRINT TAB(ID)"Program: "FI$ T
    AB(P-LEN(FI$)) ELSE LPRINT TAB(ID)"Program
    : "FI$ TAB(P-LEN(FI$)) LEFT$(TIME$,8)  '*  8051
190 LPRINT TAB(ID) STRING$(F,"="):LPRINT   '*  2522
210 IF I$="" THEN LINE INPUT #1,I$         '*  1956
220 IF LEN(I$)<=F THEN J=LEN(I$) ELSE J=F  '*  2440
230 K=0:O=2   'O allows date printing on page
    one only                               '*   613
240 FOR I=1 TO J                           '*   929
250 IF ASC(MID$(I$,I,1))=10 THEN J=I:K=1:GOTO
    270:NEXT                               '*  3217
270 J$=LEFT$(I$,J-K):I$=RIGHT$(I$,LEN(I$)-J):L
    =L+1                                   '*  2894
300 LPRINT TAB(ID)J$                       '*  1231
320 IF EOF(1) THEN FOR I=L+1 TO 58:LPRINT:NEXT
    :GOTO 340                              '*  3426
330 IF L<58 THEN 210                       '*  1100
340 LPRINT:LPRINT '2 lines before page number  '*  1187
350 LPRINT TAB(ID) STRING$(F,"="):PG=PG+1  '*  2502
370 LPRINT TAB(ID) TAB(36) "PAGE - " USING "##
    ";PG:LPRINT CHR$(12)                   '*  3857
390 IF H$="" OR H$="T" THEN 410 ELSE PRINT "Pr
    ess ENTER when ready ";                '*  4581
400 I$=INKEY$:IF I$="" THEN 400            '*  1756
410 FOR X=0 TO 7:LPRINT:NEXT'Skip perforation  '*  1831
420 L=0:IF NOT EOF(1) THEN 180             '*  1741
440 PRINT "Press <ENTER> to run another listin
    g, <BREAK> to quit."                   '*  5296
450 INPUT Q$:IF Q$="" THEN RUN             '*  1825
                                                End
```

Illustration by Betsy Scheld

Program Listing 2. Hash-code-generating routine for the Models I/III/4 (in III mode).

```
00100 ;HASH CODE GENERATOR FOR FILE NAMES-HASH/CMD & HASH
00120 ;FOR MOD I, MOD III, AND MOD 4 (IN MOD III MODE)
00140         ORG     7000H
00150         DI
00160         CALL    CLS
00170 START   LD      HL,MSG1         ;INP 11 BYTE FILE NAME
00180         CALL    DSPLY
00190         CALL    SKIP
00200         CALL    INPUT
00210         LD      HL,BUFFER       ;FILE NAME & EXTENSION
00220         LD      B,11            ;11 BYTES TO HASH
00230         XOR     A               ;ZERO OUT 'A'
00240 HASH    XOR     (HL)            ;MODULO 2 ADDITION
00250         INC     HL              ;NEXT BYTE TO HASH
00260         RLCA                    ;ROTATE A LEFT THRU CARRY
00270         DJNZ    HASH            ;JP HASH TILL 'B' = ZERO
00280         OR      A               ;CHECK FOR ZERO HASH CODE
00290         JR      NZ,HASH1        ;NOT ZERO GOTO HASH1
00300         INC     A               ;IF ZERO, CORRECT IT
00310 HASH1   LD      (HASH2),A       ;STASH HASH IN BINARY
00320         CALL    HEX8            ;CONVERT HASH TO HEX
00330         CALL    SKIP
00340         LD      HL,MSG2         ;AND DISPLAY HEX VALUE
00350         CALL    DSPLY
00360         CALL    049H
00370         CP      1               ;BREAK KEY PRESSED? IF SO
00380         JP      Z,402DH         ;GOTO MODEL III DOS READY
00390         CALL    SKIP
00400         JP      START
00410 MSG1    DEFM    'Input 11 byte filename/extension. Use '
00420         DEFM    'spaces to fill if needed. Do not input '
00430         DEFM    'the (/) symbol if used.'
00440         DEFB    0
00450 MSG2    DEFM    'The hash code is '
00460 HEX     DEFW    0
00470         DEFM    ' Hexadecimal.'
00480         DEFB    0
00490 DSPLY   LD      A,(HL)
00500         CP      0               ;END MESSAGE DELIMITER
00510         RET     Z
00520         CALL    033H            ;DISPLAY BYTE ON VIDEO
00530         INC     HL
00540         JP      DSPLY
00550 HASH2   DEFB    0
00560 INPUT   LD      A,11            ;11 BYTES TO HASH
00570         LD      (COUNT),A
00580         LD      HL,BUFFER
00590 IN1     CALL    049H            ;AWAIT KEYBOARD INPUT
00600         CP      32
00610         JP      M,INPUT
00620         CP      91
00630         JP      P,INPUT
00640         LD      (HL),A
00650         INC     HL
00660         CALL    033H            ;DISPLAY BYTE ON VIDEO
00670         LD      A,(COUNT)
00680         DEC     A
00690         RET     Z               ;11 BYTES IN = ALL DONE
00700         LD      (COUNT),A
00710         JP      IN1
00720 SKIP    LD      A,13            ;TWO VIDEO CARRIAGE RET
00730         CALL    033H
00740         LD      A,13
00750         CALL    033H
00760         RET
00770 COUNT   DEFB    0               ;BYTE COUNTER
00780 CLS     LD      HL,15360        ;BEGIN VIDEO MEM
00790         LD      (16416),HL      ;MOD I & III CURSOR
00800         LD      DE,15361
00810         LD      BC,1023
00820         LD      (HL),32         ;FILL VIDEO SPACES
00830         LDIR
00840         RET
00850 HEX8    PUSH    AF              ;CONVERT BINARY TO HEX
00860         LD      HL,HEX          ;CONVERTED HEX STASH
00870         RRA
00880         RRA
00890         RRA
00900         RRA
00910         CALL    BINHEX          ;GENERATE FIRST BYTE
00920         POP     AF              ;GENERATE SECOND BYTE
00930 BINHEX  AND     0FH             ;AND IMMEDIATE WITH 'A'
00940         ADD     A,90H           ;ADD TO 'A'
00950         DAA                     ;CONVERT 'A' TO BCD
00960         ADC     A,40H           ;ADD IMMED W/CARRY 'A'
00970         DAA
00980         LD      (HL),A          ;STASH HEX VALUE
00990         INC     HL
01000         RET
01010 BUFFER  DEFS    11              ;FILENAME/EXT STASH
01020         DEFB    0
01030         END     7000H
```

End

Slinging Hash

Program Listing 2 is a short assembly-language routine that generates any Model I/III/4 filespec's hash code. It runs on the I, III, and 4 in the III mode, and the hash codes are valid for TRSDOS 2.3, 1.3, and 6.2.

The file names can be up to eight characters long with up to three-character extensions. Do not enter the slash (/) symbol.

To get the hash code for a file, Test/BAS, execute the routine and enter TEST (four spaces) BAS for a total of 11 characters. You must always enter 11 characters with the extension as the last characters. If you use no extension, enter spaces to fill the 11 bytes.

Dick Robertson
Chautauqua, NY

The Old Character Switcheroo

The following code switches between the Model 4's space-compression and special characters from Basic:

```
10 CLS:PRINT CHR$(200);:IF
   POS(X)>5 THEN PRINT
   CHR$(21);
```

This line turns on the special characters. Changing the greater-than (>) sign to a less-than (<) sign turns on the space-compression characters.

If clearing the screen is inconvenient at the point where you wish to make the switch, change the CLS to:

```
PRINT@(L,0),CHR$(200);
```

where *L* is any convenient line on the screen. The semicolon (;) after CHR$(200) is necessary; otherwise the computer sends a line feed, and POS(X) will always be zero.

Patrick P. Brown
San Francisco, CA

Update: Vitamin E Poke for 4 in III

I've found a way to incorporate Wayne Culbreth's speed-up Poke for the Model 4 in III mode (Reader Forum, February 1987, p. 25) in a Do file:

```
BUILD SPEED/BLD
BASIC

.Press enter three times.
POKE 16912,200

.Press enter three times.
CMD"S"
SCRIPSIT
.Press enter once and then break
to exit.
```

The additional enter keystrokes are sometimes necessary to give the computer some "breathing" room.

Setting up my example as an autoload file (AUTO DO SPEED/BLD), allows your Model 4 to automatically boot in the program specified, Scripsit in this case. By omitting the program name, the computer returns to DOS in the faster mode.

Robert N.L. Forman
Monmouth, IL

Illustration by Betsy Scheld

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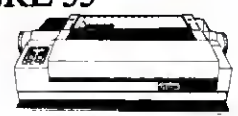

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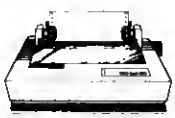

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Tandy 1000 EX

by John D. Wolfskill

★★★★

The Tandy 1000 EX comes with 256K RAM, one disk drive, and three expansion slots. Tandy Corporation, Fort Worth, TX 76102. Catalog no. 25-1050, $599.

The 1000 EX is one of Tandy's new line of hybrid computers designed to appeal to a wide range of users. Categorizing the EX is not easy. Its built-in keyboard and side-facing disk drive give it the appearance of a home computer. Tipping the scales at a mere 11 pounds and being small enough to tuck under your arm make it highly transportable.

Toss in a dual-speed 8088 CPU capable of running most PC software and the EX becomes a somewhat PC-compatible machine. Add features like a multivoice sound chip, headset connector, 16-color graphics, and network expansion adapter, and the computer seems a natural for the school and educational market.

Standard features include a slim-line, 5¼-inch, 360K internal floppy-disk drive; 256K RAM (expandable to 640K); a parallel printer port; dual joystick ports; and a 90-key, full-stroke keyboard with numeric keypad. The EX can drive RGBI, color, or monochrome composite monitors or a standard color-television receiver via an optional radio-frequency modulator. Other features include an internal speaker with adjustable volume control and an ⅛-inch headset connector. A rear-mounted, IBM plug-compatible expansion port attaches an optional 360K, 5¼-inch or 720K, 3½-inch external disk drive.

The EX can accommodate up to three Tandy Plus expansion modules for adding memory (catalog no. 25-1062, $129.95), an RS-232C serial port (catalog no. 25-1014, $79.95), a 1,200-baud modem (catalog no. 25-1018, $199.95), a mouse/clock calendar (catalog no. 25-1015, $99.95), or a network adapter (catalog no. 25-1019, $299.95).

You must install the Plus memory module before other expansion modules. It provides a direct-memory-access (DMA) controller, boosts memory to 384K, and provides empty sockets for an additional 256K of RAM.

Bundled software includes MS-DOS 2.11.24, GW-Basic 2.02, and Personal Deskmate, an extensive desktop application manager similar in design to Microsoft's Windows operating environment.

Setup

The start-up and installation documentation is well written and easy to understand. MS-DOS and Basic coverage is adequate, but you must purchase additional manuals for other than casual use. Setting up the 1000 EX is simple. Separate manuals and reference guides move you quickly through equipment setup to installation of the Deskmate software. Adding the Plus memory-expansion module takes only a few minutes due to the handy top-mounted, slide-off, expansion-slot cover.

An optional stand (catalog no. 26-210, $29.95) holds a monitor and optional second disk drive above the keyboard. The 1000 EX works with all Tandy RGBI color monitors, except the high-resolution CM-1. Text quality and color reproduction are excellent with the CM-10, good with the CM-5, and only fair with the machine plugged into a composite color monitor or color TV.

Spacewise, the unit's small footprint is deceptive. The sideways-mounted internal disk drive requires 9 to 12 inches of free desk space to the keyboard's immediate right to comfortably insert and remove disks.

In addition, the drive-activity light isn't visible from the normal operating position, making a reassuring glance for proper drive operation difficult. The unsettling honk of the Teac 55B disk drive provides the only indication that a disk access is in progress. However, the ultraquiet cooling fan helps balance the overall noise level.

Under the Hood

The computer is heavily shielded for radio-frequency interference (rfi) and produces negligible television interference when operating directly atop and sharing the same line outlet as a television receiver. This effort to reduce stray radiation is a noteworthy improvement over earlier versions of the Tandy 1000. Inside, you'll find a 48-watt power supply adequate to power the expected load of the computer and its three expansion slots.

Keyboard feel and response is good. All keys provide adequate resistance and solid tactile feedback. The keyboard is identical to the original 1000, except for the relocation of the caps—and number-lock indicator lights and the addition of a power-on light in a cluster above the numeric keypad. Unfortunately, the EX

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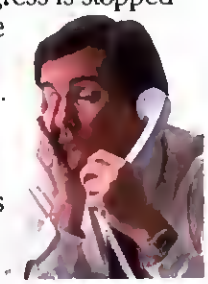

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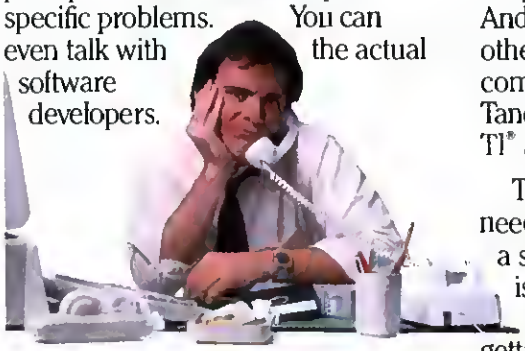

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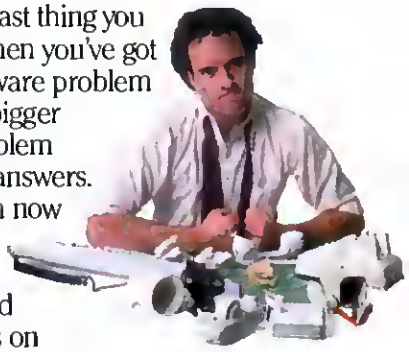

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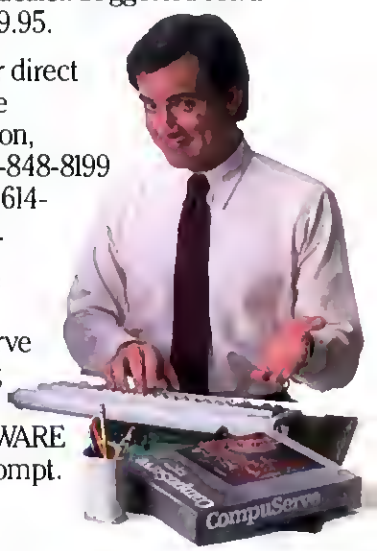

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suffers the same keypad mapping problems that make all Tandy 1000s inconvenient to use with many software packages written for the IBM PC.

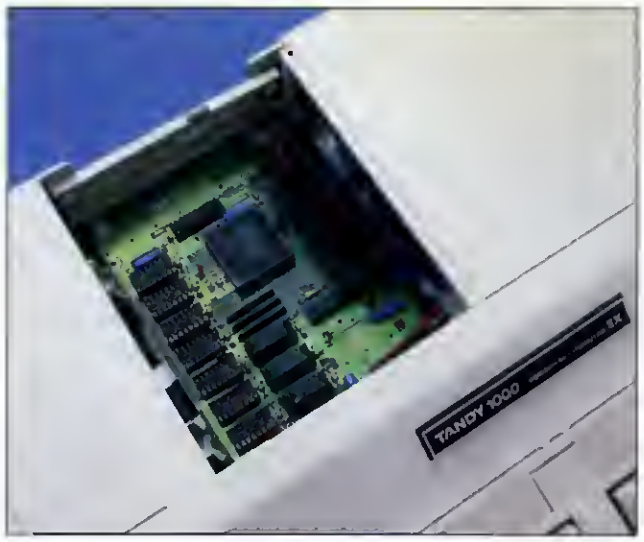
Performance

The EX's dual-speed Intel 8088-2 CPU normally runs at high speed (7.16 megahertz [MHz]). However, you can press the F4 function key just before loading DOS to toggle the clock to slow speed (4.77 MHz). You cannot change the clock speed from within an application without returning to DOS or the Deskmate shell.

The EX scored a consistent 1.4 on the Norton Utilities system-information test while running at high clock speed, indicating that the machine operates approximately 40 percent faster than the original IBM PC.

The 8088-2 and Phoenix Software Associates ROM basic input/output system (BIOS) chip successfully navigated every application I tested, including Lotus's 1-2-3, Multiplan, PFS:File, Quickbasic 2.0, and graphics-oriented applications such as Flight Simulator, Jet, and Prodesign II CAD.

However, the EX won't run color software designed for the IBM Enhanced Graphics Adapter (EGA). An EGA-compatible expansion board to fit the 1000 EX proprietary expansion bus is not currently available. The EX accepts only Tandy Plus (and third-party) expansion modules.



Inside the Tandy 1000 EX.

Personal Deskmate

Personal Deskmate comes as part of the bundled software package. The massive two-disk package provides productive start-up software covering a variety of home and personal applications. It acts as a memory-resident manager for controlling the Deskmate modules. It also doubles as a DOS file manager and provides a way to run almost any program directly from the Deskmate core.

The package consists of six program modules. Text is a graphics-driven text processor. Worksheet is a 99-row by 99-column spreadsheet. Filer is an all-purpose information storage and retrieval system. Paint adds an excellent graphics painting program, while Calendar lets you keep track of schedules and appoint-

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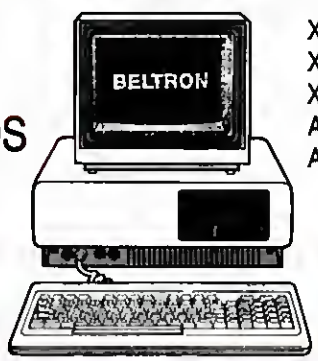

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ments. Telecom provides a full-function telecommunications program when the optional Plus serial or modem modules are installed.

A mouse-oriented, point-and-click application manager called the Tandy Desktop manages the Deskmate modules. Its features include a calculator, five-page notepad, phone list, and DOS file manager. You can define any application program (and its accompanying data files) as a module. You can create, display, resize, delete, and shuffle a module around the Desktop screen, then run it as a stand-alone application with return to memory-resident Desktop.

Navigating through Personal Deskmate is a snap using the keyboard, a joystick, or a mouse. The documentation recommends using the Tandy Digi-Mouse (catalog no. 26-1197, $99.95) and Plus clock/mouse expansion board. If you don't need a clock/calendar, you can get the same results by installing the joystick device driver and using the Tandy Color Mouse (catalog no. 26-3025, $49.95).

The Desktop accessory option lets you redefine screen colors and communications parameters, customize printer setups for most any printer, and much more. Although you'll rarely need them, excellent context-sensitive help screens are a keystroke or double mouse click away.

The only problem with Personal Deskmate is its behemothic size. You need at least 384K RAM to load the entire package into memory without dispersing the modules onto individual disks. In this configuration, you must load modules from separate disks to make them available to the Desktop core. Single-drive users will find frequent disk accesses and disk swaps the order of the day.

The 1000 EX offers quality in materials and workmanship.

Summary

At $599, the 1000 EX is an exceptional value. It bespeaks quality in materials and workmanship. The low base price, solid documentation, and ability to run IBM PC software make it an excellent computer for home or school. Following earlier mediocre attempts at providing productive bundled software (Deskmate I and II), Tandy has done it right this time. Personal Deskmate is unquestionably the best application manager currently available for a personal computer.

The application manager lets you work with Deskmate's modules.

However, the EX is not a "something for everyone" computer. If your plans include expanding the EX into a high-powered, PC-compatible machine later on, you'll find its lack of internal expansion and its proprietary system bus a roadblock. ■

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Subroutines to Go

by David A. Williams

★★

ASP runs on the Tandy 1000/1200/3000. Aspen Systems, P.O. Box 1163, Grand Junction, CO 81502, 303-245-3262. $130.

★★★

ASE runs on the Tandy 1000/1200/3000. Aspen Systems. $99.

Program development is easier when you have ready-made subroutines on hand to inseri where needed. If your subroutine collection is lacking, Aspen Systems has two offerings that you might consider. ASP is a group of 139 subroutines in a single library file. Its functions include simple arithmetic, sorting, display, and disk input/output (I/O). ASE is a subroutine editor that helps you design custom data-input screens with windows and verification of user input.

You can use both packages with Microsoft Basic, Fortran, Cobol, and Pascal compilers; with the IBM Basic interpreter; or in assembly-language programs. Aspen Systems does not require royalties if you display an acknowledgment on the final program.

I evaluated both products on a Tandy 1200 HD with Microsoft's Basic compiler, Bascom, and Macro Assembler.

ASP

The ASP subroutines were originally written for CP/M. Aspen Systems has updated and expanded the CP/M version, but modern MS-DOS-based compilers need less assistance than their CP/M predecessors. Still, the package provides some functions you might find useful. The subroutines enhance Fortran's string-manipulation capability and provide large-number, decimal arithmetic for Basic. If you use assembly, which has few built-in functions, ASP could be a great time-saver, but the documentation provides limited help for the assembly programmer.

The functions fall into the categories of data formatting and conversion, screen and keyboard I/O, disk I/O, arithmetic, and sorting. Some are trivial. One merely sends a carriage return to the display, and many of the disk I/O routines duplicate BIOS and DOS functions.

The 300-page manual is the weakest part of this package. It was reproduced from the output of a poor-quality dot-matrix printer, but the manual's poor legibility is exceeded by its lack of clarity. It contains interesting historical and tutorial information, but it is of little practical help in the application of the subroutines. The installation and configuration instructions are especially confusing; information contained in a Readme file supersedes many of the manual's instructions. The documentation has numerous errors and program sequences that don't work.

Fortunately, sample programs illustrate the application of some of the subroutines. ASP provides Fortran, Pascal, and Basic source code for these programs, all of which ran and performed.

Except for the arithmetic functions, ASP's performance is disappointing.

Between the sample programs and a great deal of experimentation, I did get several routines working in test programs. Except for the arithmetic functions, performance was disappointing. ASP routines did not improve Bascom's screen-display times, an area sorely in need of improvement. Even compiled Basic is much slower than those snappy assembly programs that write directly to the display buffer. The memory-sori routine showed a small performance improvement. A program to sori a 1,000-record, six-element array took 5.3 seconds using the ASP routine, but only 5.9 seconds with Bascom using a standard sori procedure. The EXE files for my test programs were about 15 percent larger when I used the ASP routines.

ASP should yield a substantial performance improvement when used with the Basic interpreter, but Quickbasic would be a better investment.

The arithmetic subroutines will be of interest if you program in Basic and write financial packages or programs requiring exact results when handling large numbers. ASP uses decimal arithmetic on strings of ASCII digits that can be up to 65,535 digits. It is impressive to multiply two 30-digit numbers and see the result appear instantly. The routines are limited to simple arithmetic functions; they don't include scientific functions.

ASE

ASE provides complete screen-management and data-input functions in two major subroutines. The package also includes several supporting routines for moving data around in memory, reading and writing files, data conversion, and simple screen display.

Don't expect to write a word processor or even a reasonably capable text editor with this product. ASE's primary mission is to provide sophisticated data entry for forms-oriented applications. The programmer has complete control over display and record formats and can design the format to change in response to user input. The usual cursor movements are present, including block functions.

You can tightly control the length and content of user input. The input-validation scheme checks for length, range, and format, and you can display error messages to tell the operator what is wrong. ASE also provides select inputs, giving a choice of several options.

The ASE manual, a considerable improvement over ASP's, is clearer and more readable. Still, ASE is a complex program, and you can expect to spend a substantial amount of time reading the manual and studying the single programming example.

The demonstration program is a comprehensive example of an ASE application. It includes well-annotated source code in all the supported languages except assembly. The key assignments used in the demo seem a little odd (delete and backspace perform the same function), but you can change them to your liking.

ASE uses a Map file to control display formats. Each window requires a different file, and the program can dynamically change them. The Map file conveys no actual visual impression of what the display will look like. Prepared with a text editor, Map consists of a string of command mnemonics and parameters. The order of the commands determines the order in which the items will appear in the final display.

The available command parameters are many and complex. In fact, ASE is a mini-programming language that includes conditional statements and loops. You can use conditionals to change the format of the form as a function of user response. For example, the Option command, performing like the Basic On. . .Goto statement, branches to one of a number of command strings.

The Bottom Line

While I can't recommend these packages for the novice, they might interest the serious or professional programmer. Of the two, the editor is more useful. The problem with this type of package is that it has to be flexible enough to meet a wide variety of requirements. This leads to larger code and poorer performance than is possible with a custom design. I would find the products more useful if they included source code that I could modify to suit my application. ■

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Microprocessor: Intel 8088 @ 4.77mHz	YES	YES	YES	YES
	8mHz Optionel	NO	7.16mHz STD	NO
Power Supply Rating	150 WATT	63.5 WATT	54 WATT	130 WATT
IBM Standard Bus:	YES	YES	NO	YES
Operating System:	MS-DOS 3.2	EXTRA	MS-DOS 2.11 (3.2)	MS-DOS 3.1
Disk BASIC:	YES	IN ROM	YES	YES
MS-DOS end BASIC Ref. manuals:	YES	EXTRA	EXTRA	YES
Standerd Syatem RAM:	640K	256K	256K (384K)	512K
Cost to Expand RAM:	-0-	$$	$259 ($129)	$
Keyboard:	'AT' STYLE	STD	NON-STD	STD
Video Monitor: (composite)	INCLUDED	EXTRA	EXTRA	INCLUDED
Video Outputs:	BW/NTSC/RGB	EXTRA	NTSC, RGB	B/W, RGB
Disk Drive Capecity:	1-360K	1-360K	1-360K (2-360K)	2-360K
Max Number of Internel Drives:	4	4	1 (2)	2
Internal Expansion Slots:	8	5	1 (5)	4
Accepts Standard IBM Cards:	YES	YES	NO (10" Only)	YES
8087 Meth Co-Processor Option:	YES	YES	NO (YES)	YES
Sturdy Steel Cese:	YES	YES	PLASTIC	PLASTIC
Standard Parallel Ports:	1	0	1	1
Standerd Joystick and Light Pen Ports:	YES	NO	J (J/LP)	NO
Standerd Serial Ports:	2 (1 Optional)	0	0	1
Werranty	1 YEAR	90 DAYS	90 DAYS	15 MONTHS
Clock/Calender	YES	NO	NO	YES
Cost Reedy-to-Run	$699	$3,063	$1,398+ ($1,683+)	$1,295
8mHz Option	$799			

Add $35 for ground delivery; $70 for elr.

IBM XT cost figures*: Video Display Adapter $250; Video Display $275; IBM XT computer $2,145; Additional Ports, serial port, game port, parallel port, 640K RAM $308; DOS 3.2 and BASIC $05; Total $3,063. Does not include the battery back-up clock calendar. No light pen port.

Tandy 1000 cost figures*: DOS 2.11 and BASIC reference manuals $29+; Memory Plus Expansion Board (to 384K) $129+; 256K Additional RAM $129+; One serial Port $79+; Battery Back-up Clock Calendar $99+; Composite Monochrome Monitor $129+; Model 1000 EX Computer $799; Model 1000 SX Computer $1199; We were not able to equip the Tandy 1000 to directly compare with the Clone because of the 1000's inherent design limitations.

*The above prices are list prices as best we could determine. Both the IBM and Tandy are available at a discount.

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300-1200 Internal Modem & Software	149	300 Watt Uninterruptable Power Supply	299

OUR GUARANTEE

Simply, if anything is wrong with your Clone or any of its peripherals, we'll fix it free for up to one year after you've received your Clone. You have probably read other manufacturers' warranties, and gotten confused, suspicious or even mad. You're probably skeptical about anything as simple and straightforward as our warranty. So here's the fine print.

You can void your warranty by failing to exercise normal care when hooking up or operating your Clone. Or trashing the guts with a hammer. Or running it over with something. Or burning it up.

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Smart, But Not Wise
by Mark D. Goodwin

★★

E1 runs on the Models I/III/4 (48/64K) and the Tandy 1000/1200/3000 (128K) and requires TRSDOS 6.2 and two disk drives. Pittman Associates, Suite 272, 7837 Greenback Lane, Citrus Heights, CA 95610, 916-966-7769. $149.95.

E1 is an artificially intelligent database program: it makes relationships among data that you enter in the form of keywords and phrases, along with their definitions. The way in which E1 makes these relationships depends on the questions you ask it.

The system handles information through four operational modes: Learn, Request, Forget, and Dump.

The first step in using E1 is entering concepts and dictionary items in its Learn mode. Figure 1 presents the five grammatical structures E1 can use to learn new concepts. Figure 2 illustrates how these grammatical structures link concepts. Dictionary items are keywords or phrases that require lengthy definitions. You enter these items into the data base by telling E1 the specific keyword or phrase and then entering its explanatory text.

Once the E1 data base has absorbed data, you can access it by asking E1 questions in the Request mode. Some questions can generate a yes or no response. Therefore, E1 lets the operator request a reason for the resulting response. You prompt E1 for an explanation by asking "How?," "Why?," or "How Do You Know?," or simply by demanding that E1 prove it.

You can also access the E1 data base through the Dump mode. It generates a complete listing of the data base's concepts, keywords, and phrases. The Dump mode's listings can be particularly useful for learning whether the data base contains information relating to a specific piece of data.

As with all data bases, an E1 data base will eventually hold a great deal of unnecessary data. You can purge it from the data base through E1's Forget mode. The Forget mode lets you purge data by a statement, a specific keyword or phrase, or a concept. When you use a statement for purging, you use the Learn mode's grammatical structures. Whenever you purge a concept from the data base, E1 automatically deletes all references to it.

The E1 documentation is a poor, 39-page manual. While the manual presents an overview of the system, its lack of detail is confusing. For example, the manual doesn't give a step-by-step procedure for executing E1. Although execution is

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X is a Y	For equality
X has Y	For inclusion (X contains Y)
X is Y	Where Y is a quality of X
X can Y	Capability, capacity, facility of
X is like Y	Similarity, analogy, approximation

Fig. 1. Learn-mode grammatical structures.

ORANGE
is a
CITRUS FRUIT
has
VITAMIN C
can is
PREVENT SCURVY WATER SOLUBLE
STATEMENTS:
ORANGE IS A CITRUS FRUIT
CITRUS FRUIT HAS VITAMIN C
VITAMIN C CAN PREVENT SCURVY
VITAMIN C IS WATER SOLUBLE

Fig. 2. Sample structures.

simple, simple procedures are often the most confusing to novices. The manual's only bright spot is its sample program runs.

E1 has many other problems, as well. Although it is a compiled Basic program, it is excruciatingly slow. Other problem areas include insufficient error trapping of keyboard entries, non-recognition of lowercase letters, and erratic performance by the Forget mode.

E1 needs an enormous amount of disk space. Besides the programs on the system disk in drive zero, the data disk in drive 1 is completely filled with program overlays. Therefore, only a minimal amount of space is left on the system disk for the data base's files.

Finally, the programming techniques used to implement E1 are second rate. For example, the Basic Input statement is used throughout the program for data entry. Although Input is acceptable for personal programming efforts, it is unacceptable for commercially produced programs and gives E1 a shoddy appearance.

Conclusions

Although I applaud the idea of producing an artificially intelligent business program, it's hard to get excited about E1. Its complete lack of speed and amateur implementation reduces E1 to an almost useless program. I can't think of even one task that couldn't be done better manually or with a more traditional data-base program. With an improved manual, a great deal more speed, and a few bells and whistles, E1 could have limited use.■

Stuffed Model 100

by Thomas L. Quindry

★★★★

The CMOS Expansion RAMs increase the Model 100's memory capacity to 64K, 128K, or 224K. PG Design Electronics Inc., 37560 Thirty-one Mile Road, Richmond, MI 48062, 313-727-2744. $300, $425, and $575, respectively.

★★★★

The Data Transfer Utility Program runs on a 32K Model 100. PG Design Electronics Inc.

PG Design introduced the concept of adding an extra bank of 32K memory to the Model 100. This first breakthrough doubled the 100's user RAM. Now PG Design offers 64K, 128K, and 224K expansion RAM modules that increase your Model 100's user RAM to three, five, and eight times, respectively.

Although the 100's CPU allows access of only 32K of user RAM at a time (in addition to the 32K ROM), it also permits switching out the Tandy 32K RAM or ROM bank and substituting other, higher-capacity RAM or ROM.

Not only can you upgrade your 100 to 224K of extra RAM (seven 32K banks), but, due to its design, you can still use the ROM socket where programs on a chip can add extra utility without sacrificing RAM.

I had been using PG Design's 64K expansion RAM for the past year before installing the 224K RAM bank. The hardware looks the same, and the quality is excellent. I've had no problems.

The expansion RAM has a U-shaped circuit board that connects to the expansion bus in the cavity on the bottom your Model 100. You cannot use these expansion RAMs on the Model 102 because it doesn't have this expansion-bus cavity. A 3-volt lithium battery with a six-year shelf life provides back-up power for the expansion RAM.

A simple, one-line bank-select program is included to let you change from the original Tandy memory to any of the PG Design memory banks. This small program also allows you to select and cold-start any memory bank if a problem occurs, freezing the bank.

Since each 32K bank of memory simulates a separate computer, your programming efforts are limited to 32K for the code, all operations, and computations associated with it. Using the 224K RAM module, for example, would be like switching to one of eight different computers, each with its own set of programs. PG Design includes software to allow you to transfer data or programs from one bank to another.

The Data Transfer Utility Program

The included Data Transfer Utility Program uses about 1,600 bytes, comes on cassette, and has a loader that places it at the right memory address; you then customize it for the particular RAM-expansion module you have.

You get three other useful functions all under function-key control. You can kill or rename a file and select a forced line feed with carriage return when printing text files. The lack of a forced line feed is one of my biggest complaints about the Model 100.

The program provides two other useful bits of information: the size of each file you select by cursor and a notation on which bank you are in. Although the Data Transfer Utility Program is meant to be resident, you can disable it with a function-key command. Residency offers an advantage over PG Design's nearest competitor, who includes an expansion ROM for data transfer. Since the program is resident, you can install other ROMs without losing other functions.

I found only one problem with the Data Transfer Utility Program. Its operation is timing sensitive, and it requires that your primary 32K RAM bank be original Tandy or of the identical specifications. PG Design sells 8K RAM modules that work as well as the Tandy RAM, but 8K RAMs from some other distributors fall short of the mark.

Before PG Design's latest software update, the company recommended using Purple Computing's 8K RAM. I have used the previous Data Transfer Utility Program with my 64K RAM module and a Purple Computing 8K module with no trouble. With the updated software, the Purple Computing 8K module doesn't work, even with the 64K module. PG Design has made its timing tolerances too tight. However, for a small fee, the company does offer a trade/replacement for incompatible RAM.

I've found that the best way to use the extra RAM banks is to store programs or backups of important files. When I want to run a program or two, I use the Data Transfer Utility Program to copy the program to the first bank, much as I would from a disk drive. Then I run the program from there. If it generates a data file, I copy the data to another bank for safekeeping.

Summary

Although I recommend a disk drive for complete and efficient storage of your prized files, I find that the extra 224K holds more than I would ever use at one time. It frees me from taking my disk drive on trips.■

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PC - SPRINT 1000

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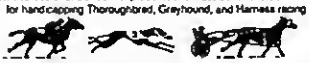

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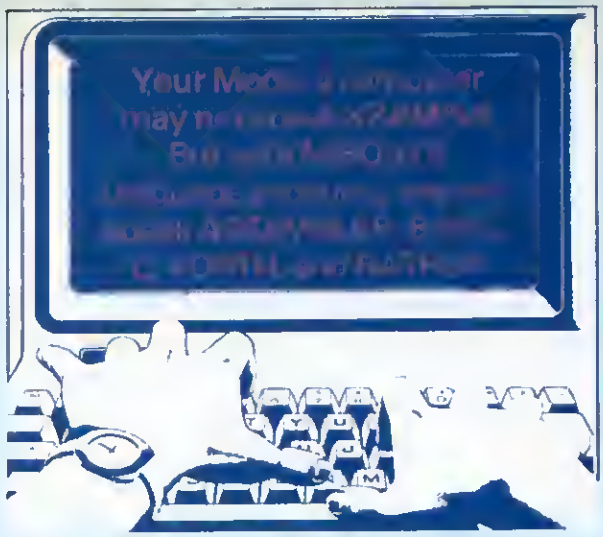

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A 4P Modem That Works

by Jack Feldman

★★★★

Teletrends TT512P Modem is an internal, 300/1,200-baud modem for the Model 4P. Teletrends Corp., P.O. Box 2198, Garden Grove, CA 92642, 714-554-7401. $179.95.

Purchasing a Tandy computer is like joining a club. If Tandy makes a mistake, a lot of clever club members can see the flaw and find a way to make it right. The shortcoming for the Model 4P was its modem. Although the built-in modem for the transportable was a good idea, Tandy's implementation was lacking: It featured a 300-baud modem at a time when 1,200 was common and an autodialing scheme that defied logic. This modem took the 4P out of consideration as a working computer for telecommunications.

Enter the Teletrends TT512P board. This internal modem gives the 4P the telecommunications punch that makes it a serious computer for on-the-go operations. It fits neatly in place of the Tandy modem board, runs at either 1,200 and 300 baud, and uses the familiar IBM PC AT dialing protocol. And it costs little more than did the discontinued Tandy modem.

Instaliation

Installation is easy. First, disconnect your 4P from all power sources. Look at the rear of the computer, find the cover plate to left of center, and remove it. If you're replacing an existing modem, remove its cable from the DB25 connector and gently pull the modem card from the edge-card connector and out of the computer.

Insert the new modem in the slot and make sure the card is firmly seated. Although they were out of stock as of press time, Teletrends promises to include a replacement cover plate with the TT512P. This cover is designed to be used in place of the 4P's cover and fastened with the screws you removed from the original plate.

The TT512P makes the 4P a serious computer for on-the-go operations.

Now plug the new cable into the 4P's DB25 connector and connect the modem to the phone line. You can also connect your phone to the other modular jack on the modem card.

Using the Modem

If you have a terminal program that has an autodial feature, you don't have to read the manual to get started. Fortunately, I had an autodial terminal program and a Hayes modem at hand, so the first test was to see if the modem would work without changes. Everything worked fine. There were some differences, but they were minor.

First, you do not hear the modem placing the call and making the connection. The card has no room for a speaker, so when the number dialed appears on the screen, you have to wait for the screen to tell you if you've been connected or if the modem has timed out.

As a plug-and-go system to use with software already configured for the 4P, the modem is a winner. Before reading the manual, I used the modem with a variety of terminal programs and hosts, including the following public-domain software: PTerm in Model 4 mode with TRSDOS 6.2, LTerm in Model III mode with LDOS, and MEX in Model 4 mode under CP/M.

Since the manual mentions Modem80 as a commercial package that works with the modem, I tried that, too. I found that all the packages worked perfectly.

I used the various terminal packages to dial into a variety of host computers. First, I dialed a 3B2 system and then called the Teletrends data number to leave a technical question. After that, I downloaded data from bulletin-board systems (BBSes) around the country. Finally, I called the Knowledge Index as an example of a commercial data-base search.

The TT512P also features autoanswer, which lets you use your 4P as a host computer, and speed shift, which lets you, via software, select the speed at which you access a BBS. The software and modem work together to keep your computer sending at the speed appropriate for the individual BBS.

The TT512P doesn't have a switch that lets you turn off the autoanswer. When you boot TRSDOS 6.2, the modem sets DTR (data terminal ready) to "on," whether you have a terminal program resident or not. To keep the modem from responding to an incoming call, when you boot the program use the DOS Sysgen command to turn the Setcom DTR parameter off. But the manual doesn't cover this.

The Teletrends TT512P modem works well with software designed for the 4P.

Undocumented Information

The manual does seem brief, but the TT512P is a plug-and-go device: You plug it in, and it works nicely with the 4P. However, you'll need further technical information if you intend to set up a BBS.

The manual doesn't include a technical help phone number. Although the company backs its product with a generous two-year warranty, you'll have to find its ad in *80 Micro* if you need to phone for help.

The manual refers to result codes, but it doesn't tell you what they are. The screen displays one of six result codes (for instance, connect, no carrier, ring), which indicate the modem's response to input from the computer or the line.

You can use the F code to put the TT512P in half-duplex mode, but the manual doesn't tell you about this, either. This lack of technical information isn't fatal, but it does make it difficult to get full use of the modem. The manual doesn't mention that you can use the TT512P as part of a BBS; to do so, the modem has to signal the computer that a call is coming in at either 300 or 1,200 baud. The technical section of the Teletrends BBS said that the modem had this feature, but it didn't explain how it works.

When you use a Hayes-type modem, you have to make a special cable that connects pin 12 on the modem to pin 22 on the computer. Once again, since this is a dedicated modem, the proper connection is built into the cable.

Conclusion

The Teletrends TT512P modem is well made and functions as promised. It works well with software designed for the 4P and lets you use the computer as a terminal or host. However, its manual's lack of technical information makes it more difficult to get to all the modem's features.■

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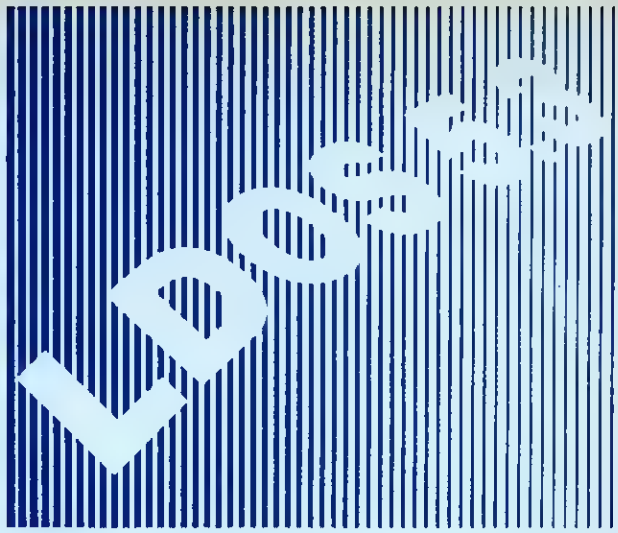

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Words and Pictures
by Harry Bee

★★★★

A-Plus ETG runs on the Models 1000/1200/3000 (256K) and requires one disk drive. Savtek Corp., P.O. Box 1077, Waltham, MA 02254. 617-891-0638. $89.95.

It's easy to find a high-quality word processor for under $100 these days. The difficulty is choosing one from the many; a new product vying for your attention must have something special to stand out from the crowd. A-Plus has what it takes.

A-Plus ETG combines a fine, medium-duty, what-you-see-is-what-you-get (WYSIWYG) word processor, A-Write, with a capable, paint-like graphics program, A-Draw, to let you create and print illustrated documents. The presentation is attractive and slick. Its implementation is almost faultless. A-Plus is easy to learn and use, yet the elements that make it easy don't get in your way. In addition, it has a full complement of file-management utilities, a clock with an alarm and a timer, a perpetual calendar (from 1582), and a six-function calculator.

The program installs easily on floppy- or hard-disk systems. Because the package is so feature rich, many program overlays and auxiliary files must be available while you work. As a result, moving between major programs is a bit slow. More importantly, because these files take up so much space on the program disk, I found a single floppy drive inadequate for using the program effectively. Two drives should be the minimum system.

A Matter of Appearances

Subtitled "The Home Work Solution," A-Plus aims for the school and home user, and nothing about the package creates a misleading impression. As a result, it is an excellent product in its intended environment.

The language of its more than 300 pages of documentation is careful and patient. The manual is thorough with plenty of illustrations, and it is fully indexed. I particularly liked the hints, usually several of them about each function, that suggest less obvious ways to get the most out of the program. In addition, plenty of context-sensitive help screens are available from inside the program, and a quick-reference card and sample files come with the package.

A-Plus's screens are clean, well-designed, and clear. You can access every function by menu selection: You highlight your choice with the arrow keys

and press the enter key. But you can also select every function with a one-, two-, or three-key command. Furthermore, express keys let you move between the major programs without having to go through the main-menu screens. In certain cases, you can get rid of the menus altogether.

For instance, within the word processor at the lowest help level, the bottom half of the screen is filled with menus. To accomplish any function, you can page through the menus until you find the one you want, then highlight and select it. If a subcommand is necessary, you find yourself in a pull-down menu with further choices. However, the menus also show you the alphabetical key you need with the control key to issue the same command. Soon, you'll need menus for reference only. When you've learned the commands sufficiently, you set the next help level, which removes the menus from the screen.

A-Write

The word processor gives you a complete set of standard editing tools, including search and replace, block cut and paste, copy, and move. You can print a block of text, but you must save it as a separate document first. Cursor control is good, and scrolling is generally quick. (Since files are disk-based, you sometimes have to wait for sections to load.)

A-Plus allows you to insert a chart into text.

Your document can include up to five separate paragraph formats specifying tabs and margins (up to 78 columns wide only), line spacing, and justification. A double-spaced paragraph appears that way on the screen. A margin release allows outdenting and line positioning to let you center titles. Page formatting includes headers, footers, and automatic numbering.

On the screen, bold, underlined, italicized, and super- and subscripted characters appear that way. Special characters cover the needs of most European languages; symbols and Greek letters facilitate math and science writing.

The most impressive of A-Plus's WYSIWYG features is the concurrent display of graphics. You can bring a drawing, illustration, chart, or headline, created with A-Draw, into your document. Once you've imported a graphic, you can move it until it's where you want it. Graphics can interrupt your text, as with a heading, or you can run text beside them. Using the margin release, you can type over or inside a graphic to make bordered text and labeled illustrations.

Whether you can print what's on the screen depends on your printer. A-Plus uses printer-specific drivers; it doesn't support all printers. The version of the program I tested included 18 drivers covering about 24 popular printers. Mine wasn't among them. However, the people at Savtek Corp. are eager to de-

Continued on p. 112

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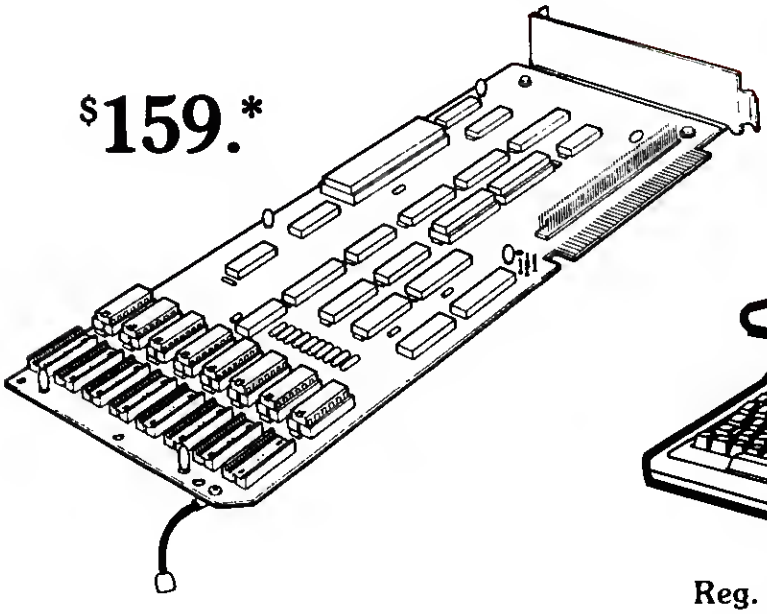

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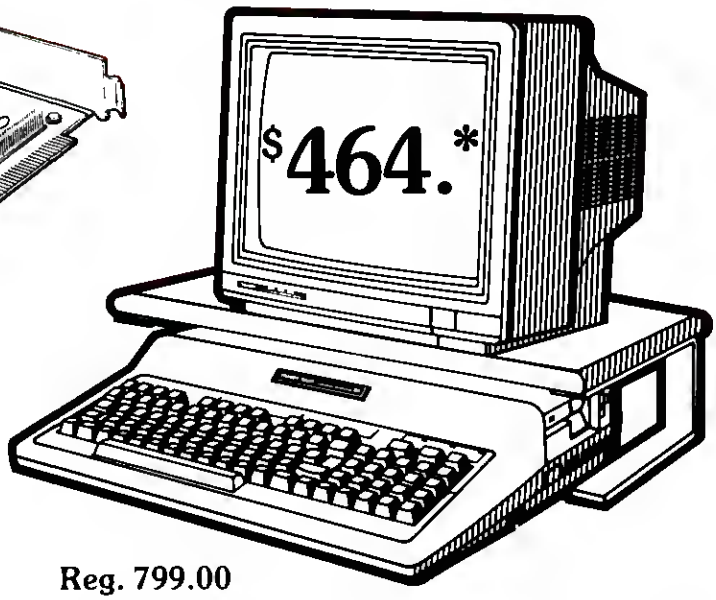

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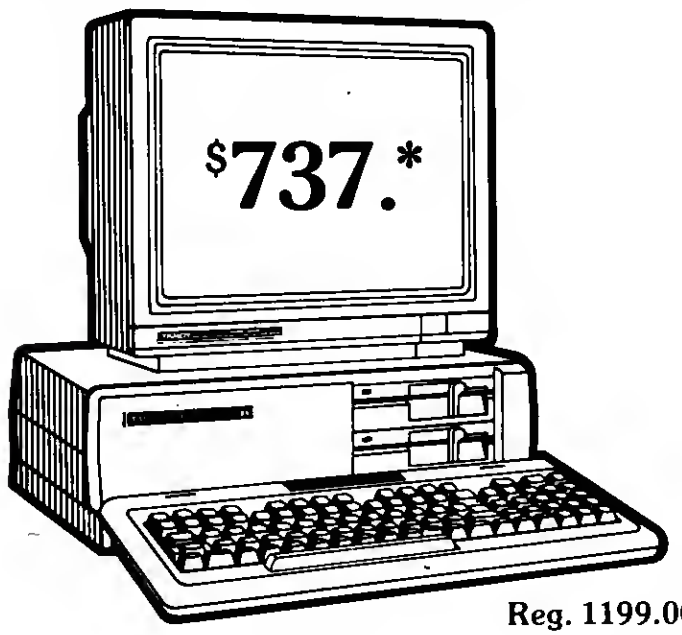

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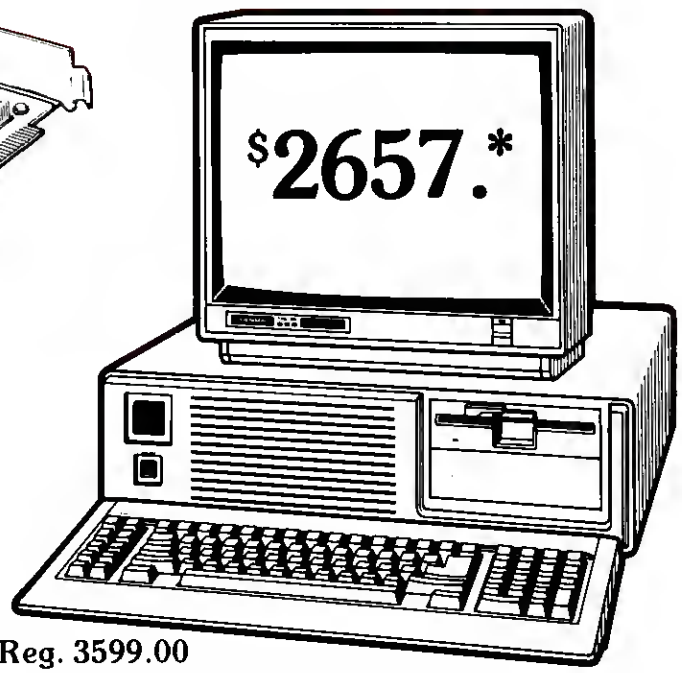

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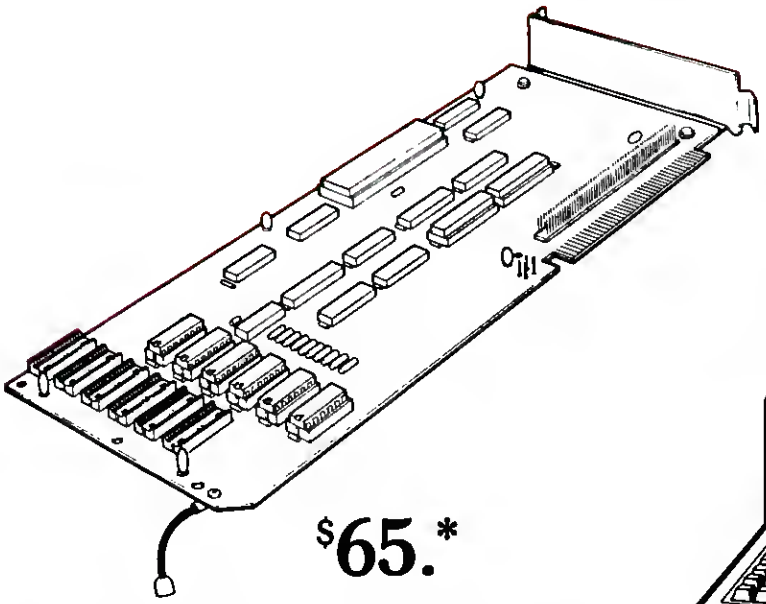

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Quick Boot

Bypass the 1000's memory test on a warm reboot.

by Dave Rowell

Sixteen seconds isn't long—roughly the time a Tandy 1000 takes to test 640K of RAM during a reboot. If you reset your 1000 a few times a day, however, those 16-second delays can become annoying. IBM owners don't have to put up with this, nor do owners of other compatibles.

Now you don't either, because I've got a program that reboots Tandy 1000s without the memory test. With Reboot loaded, you press the control-alternate-delete key sequence and your 1000 hops to it, immediately loading in the boot sector from your start-up drive.

If you're uncomfortable with assembly language, you can create Reboot with a Basic program (Program Listing 1, Reboot.BAS). The sidebar describes how to do this (see p. 48) and how to make a Config.SYS file that loads Reboot when you turn on your computer.

If you have an assembler, use Program Listing 2, Reboot.ASM, written for Microsoft's MASM. Reboot is meant only for Tandy's 1000 series. It is unnecessary on other PC compatibles, which provide a warm boot without a memory test.

System Requirements

Tandy 1000
MS-DOS 2.x to 3.20
GW-Basic or Microsoft Assembler 1.0 or later

Illustration by Earl Keleny

Reboot is a memory-resident program (Reboot.SYS) that loads as a device driver from a Config.SYS file. (I'll explain why a device driver later.) Once resident, it takes only 400 bytes of RAM. The program monitors keyboard input by filtering the keyboard hardware interrupt (9) and performs a warm boot when it detects the standard reboot key sequence (control-alternate-delete).

Easy to Remember

The BIOS keyboard-handler routine never gets to read the three-key combo, and the 1000's normal reboot procedure is avoided. I chose to usurp the standard reset sequence because it's one of the few key inputs that Microsoft Windows lets through to the BIOS keyboard handler. It's also easy to remember, and you've still got the red button if you need a full reboot.

The program reboots your 1000 by invoking the bootstrap-loader routine (interrupt 19 hexadecimal (hex) or INT 19H) that MS-DOS provides. INT 19H resets the boot drive, then loads and runs the boot program from the first sector of the boot disk.

The boot program loads the MS-DOS system files into memory, which in turn load Command.COM, and you've got your DOS prompt without the memory check. However, memory-resident programs and some device drivers create complications in both MS-DOS versions 2 and 3.

Under MS-DOS 2, the reboot sequence that INT 19H starts doesn't reset the addresses in the interrupt vector table to the original values that the ROM BIOS sets during the first boot.

Most memory-resident programs alter hardware-interrupt vectors to point to their own interrupt handlers in RAM. These handler routines are usually written over during DOS initialization, however, so that INT 19H leaves hardware-interrupt vectors pointing to inappropriate code.

When the clock chip, for instance, signals for an interrupt, as it does 18 times per second, the CPU executes the now-bogus code to which the clock-interrupt vector now points, and the computer freezes up.

To avoid the problems memory-resident programs create, Reboot stores all interrupt vectors that the 1000's ROM BIOS boot-up code sets. Reboot stores the first 32 vectors (zero–1FH), and 40H, 41H, and 44H during its installation as a device driver.

Later, when you initiate the three-key reboot, the program restores the saved interrupt vectors, zeroes out all other vector-table entries, and executes INT 19H. (To find which interrupt vectors the ROM sets, I wrote a boot-sector program that prints out the contents of the interrupt-vector table at boot-up.)

Reboot also stores and restores the equipment word (address 0:0410H) and the top-of-memory word (0:0413H). Ill-behaved programs sometimes change this important data in the BIOS data area and don't tell DOS about it.

I wrote Reboot as a device driver to get it working as soon as possible in the booting process. It's a Trojan horse to get a memory-resident program into operation before other device drivers and programs can alter the hardware interrupts. Fortunately, the DOS doesn't change any hardware-interrupt vectors before Reboot loads.

The program is a dummy device driver that performs no device functions except initialization. You must load Reboot.SYS before any device drivers that change hardware-interrupt vectors. Put it first in Config.SYS, except in unusual cases in which you must load another driver first.

Avoids Hang-ups

With MS-DOS 3.20, Microsoft attempted to protect INT 19H from the hang-ups that memory-resident programs cause. DOS 3.20 stores important vector values so that the 3.20 INT 19H can restore them before loading in the boot sector.

However, DOS 3.20 doesn't read and store the interrupts until all device drivers are loaded. If any device driver (including Reboot.SYS) intercepts hardware interrupts, INT 19H restores vectors pointing to the overwritten device-driver interrupt handlers, and booting falls.

Although the DOS 3.20 INT 19H interrupt-restore routine is in RAM (part of IBMBIOS.COM), DOS changes the INT 19H vector to point to it before loading device drivers, so Reboot can't bypass it. However, the 1000's MS-DOS 3.20 has a 1-byte flag at address 0070:1D1FH that determines whether the INT 19H will restore hardware interrupts.

If Reboot determines that it's running under 3.20, it sets that byte to zero, preventing INT 19H from changing the vectors that Reboot has restored. MS-DOS 3.10 does not attempt to restore hardware interrupts.

Even though Reboot.SYS is a dummy device driver, it must adhere strictly to device-driver format and rebuff any calls that could be made to it as a device (see "A Driver of Your Own Device," by Robert D. Covington, *80 Micro*, July 1986, p. 40, for details).

The device header under the label Header (Listing 2) is standard for a serial device. It's important to make the actual device name in the header different from the name of the file itself. Once a device is installed, you can't copy, rename, or delete any file of the same name, no matter what the extension—a problem when you're debugging or experimenting with a new device driver. The name in the header is Rboot; the file itself is Reboot.SYS.

The driver-function request handler, starting at label INTR, takes requests from DOS, but any device function other than initialize (code zero) results in an immediate return with the done bit (8) set. DOS only requests the initialize function (label Install) once at boot-up.

Reboot's initialize function stores the important interrupt vectors and other information needed later, sets up the keyboard-interrupt vector (9) to point to a handler in Reboot, then frees up the now unneeded initialization code (placed at the end of the driver) so DOS can use that space.

First, the initialization routine gets the DOS version and stores it. Reboot must treat version 3.20 differently when it reboots. The DOS version function is one of the DOS services available to device drivers during initialization.

The DOS function for getting the vector of a particular interrupt is not available to device drivers. But because the vectors that Reboot stores are contiguous, the 8086 family's powerful string commands make getting and storing the two-word vectors quick and easy.

Saves Instructions

The segment:offset combination of DS:SI points to the source at the bottom of RAM, and ES:DI points to the destination table in Reboot. The CPU automatically increments the pointers SI and DI, saving a few instructions. The equipment list and top-of-memory words are found down in the BIOS data area starting at segment 0040 hex.

Before setting INT 9 to point to its own keyboard handler, Reboot saves the current INT 9 vector. For all key presses except the control-alternate-delete reboot combination, Reboot's keyboard handler will pass control to the original handler.

Again, the DOS interrupt-vector functions aren't available during device installation, so Reboot writes the new vector itself, first disabling maskable interrupts. Otherwise, you could press a key, and the keyboard-hardware interrupt could be called when its address was only half-

changed, freezing the computer.

After setting up its interrupt handler, Reboot displays a loading message, then sets the break address in the request header that DOS uses to communicate with the driver. Now that the installation code has done its job, Reboot casts it away, starting at the label Install (the break address).

Once installed, Reboot becomes a hardware-interrupt handler. The interrupt routine is never a working part of the device driver, but the driver sets it in place and activates it.

Reboot's interrupt handler monitors codes that the keyboard sends to represent key presses and releases. When it detects a press of the delete key (scan code 53H), Reboot checks a byte in the BIOS data area (address 0:417H) that keeps the status of special keys like the control and alternate keys.

If bits 2 and 3 of this byte are set, then both of these keys are currently pressed, and Reboot jumps to its reset routine. If the delete key isn't pressed, or both keyboard-status bits aren't set, Reboot sends control to the normal keyboard interrupt handler in ROM.

I used the string functions again to transfer the stored addresses back to the interrupt-vector table. Interrupt handlers can't easily use the DOS function that changes interrupt vectors, because the DOS services aren't re-entrant.

If a handler interrupts code that's in the middle of a DOS interrupt itself, calling DOS again destroys information on the DOS stack belonging to the interrupted code. In Reboot's case, it might not matter, because the warm boot wipes the slate clean anyway.

Regardless, I used the string functions because they're easier to use, given the large number of interrupts changed. Interrupts must be disabled (with the CLI instruction) when altering interrupt vectors to prevent a higher-priority hardware interrupt (only the clock in this case) from using a vector that's only half changed.

After restoring the equipment list and top-of-memory words, Reboot checks the DOS version. If it's version 3.20, the program zeroes the flag that determines whether or not DOS restores hardware interrupts itself. Reboot then clears the screen and resets the video mode to the boot-up default: 80-column black and white.

DOS must also have a stack area during reboot. Reboot uses the same one that the ROM BIOS sets up for the boot program—the top 256 bytes of the interrupt vector table.

The last step before invoking INT 19H is to signal the keyboard that it can send further scan codes and to signal the interrupt-controller chip that this interrupt is over. (See Dave's MS-DOS Column, *80 Mi-*

Program Listing 1. Reboot.BAS.

```
1 FILE.SIZE% = 615                                                    '*  1840
2 OPEN "R",1,"REBOOT.SYS",1  'record size of 1                        '*  1620
3 FIELD #1,1 AS X$                                                    '*   984
4 PRINT "Creating REBOOT.SYS."                                        '*  2232
5 FOR I% = 1 TO FILE.SIZE% : READ X                                   '*  2071
6 LSET X$=CHR$(X) : PUT #1 : NEXT I%                                  '*  2111
7 CLOSE                                                               '*   461
8 PRINT "REBOOT.SYS created."                                         '*  2151
9 END                                                                 '*   384
11 DATA 255, 255, 255, 255, 0, 128, 22, 0, 33, 0                      '*  2253
12 DATA 82, 66, 79, 79, 84, 32, 32, 32, 0, 0                          '*  2074
13 DATA 0, 0, 46, 137, 30, 10, 0, 46, 140, 6                          '*  2048
14 DATA 20, 0, 203, 80, 83, 81, 82, 86, 87, 30                        '*  2160
15 DATA 6, 14, 31, 196, 62, 10, 0, 184, 0, 0                          '*  2057
16 DATA 30, 138, 93, 2, 128, 251, 0, 117, 3, 232                      '*  2264
17 DATA 77, 1, 13, 0, 1, 30, 137, 69, 3, 7                            '*  1969
18 DATA 31, 95, 94, 90, 89, 91, 88, 203, 0, 0                         '*  2135
19 DATA 0, 0, 0, 0, 0, 0, 0, 0, 251, 80                               '*  1776
20 DATA 30, 228, 96, 60, 83, 117, 13, 51, 192, 142                    '*  2365
21 DATA 216, 160, 23, 4, 36, 12, 60, 12, 116, 0                       '*  2199
22 DATA 31, 80, 250, 46, 255, 46, 78, 0, 31, 80                       '*  2232
23 DATA 14, 31, 190, 247, 0, 191, 0, 0, 142, 199                      '*  2256
24 DATA 185, 64, 0, 252, 250, 243, 165, 251, 185, 64                  '*  2473
25 DATA 0, 184, 0, 0, 250, 243, 171, 251, 185, 10                     '*  2298
26 DATA 0, 250, 243, 165, 251, 185, 118, 1, 184, 0                    '*  2360
27 DATA 0, 250, 243, 171, 251, 161, 82, 0, 30, 163                    '*  2359
28 DATA 16, 4, 161, 84, 0, 30, 163, 19, 4, 161                        '*  2178
29 DATA 86, 0, 61, 3, 28, 114, 12, 184, 112, 0                        '*  2149
30 DATA 142, 192, 187, 227, 31, 38, 198, 7, 0, 184                    '*  2380
31 DATA 2, 0, 205, 16, 184, 0, 6, 183, 7, 185                         '*  2110
32 DATA 0, 0, 186, 79, 24, 205, 16, 184, 48, 0                        '*  2167
33 DATA 142, 208, 188, 0, 1, 250, 228, 97, 12, 128                    '*  2368
34 DATA 230, 97, 36, 127, 230, 97, 185, 3, 0, 176                     '*  2329
35 DATA 32, 230, 32, 226, 250, 205, 25, 0, 0, 0                       '*  2188
36 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1615
37 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1616
38 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1617
```

Listing 1 continued

How to Create and Use Reboot.SYS

Using the Basic that comes with your Tandy 1000 and Program Listing 1, you can create Reboot.SYS. After loading Basic, type in the listing and save it as Reboot.BAS. Running Reboot.BAS from Basic creates the file Reboot.SYS. Copy the newly created Reboot.SYS to your boot-up disk.

You load Reboot.SYS and make it active in a file called Config.SYS. If there is no Config.SYS on your boot disk, you can use the Copy command to create it by typing the following three lines at the DOS prompt:

```
COPY CON CONFIG.SYS
DEVICE = REBOOT.SYS
^Z
```

The third line is the end-of-file marker (control-Z). To enter this line, press F6 and then the enter key. DOS then creates a file named Config.SYS with the line DEVICE = REBOOT.SYS.

If you already have a Config.SYS file on your boot disk, you must edit it and insert a new first line containing DEVICE = REBOOT.SYS. You can use Edlin or any word processor that creates pure ASCII files. You can also use the following series of DOS commands to add a new first line to Config.SYS:

```
REN CONFIG.SYS CONFIG.ADD
COPY CON CONFIG.SYS
DEVICE = REBOOT.SYS
^Z
COPY CONFIG.SYS + CONFIG.ADD
TYPE CONFIG.ADD
TYPE CONFIG.SYS
```

The first command renames the existing Config.SYS. Then the Copy command creates a new Config.SYS file containing DEVICE = REBOOT.SYS. (See above for instructions on this particular process.) The next Copy command appends the old Config.SYS (Config.ADD) onto the new Config.SYS.

Use the two type commands to make sure the new Config.SYS is the same as the old, but with the new first line that loads Reboot.SYS. If the new Config.SYS meets your approval, delete Config.ADD.

To activate Reboot, make sure both Reboot.SYS and your new Config.SYS are in the root directory of your boot disk. Then reboot your computer. You should see a message indicating that the Reboot driver is loaded. Your computer should function as usual after this procedure.

To activate a warm boot without a memory check, hold down the control and alternate keys, and press the delete key. As with a normal reset, don't invoke Reboot during a normal drive operation. You could damage the disk directory.

Reboot works on Tandy 1000s with MS-DOS version 2 or 3 up to version 3.20. If it ever happens that Reboot doesn't respond to the three-key reset sequence, or it fails to boot properly, you can always resort to your 1000's red reset button. ■

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Listing 1 continued

```
 39 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1610
 40 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1610
 41 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1611
 42 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1612
 43 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1613
 44 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1614
 45 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1615
 46 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1616
 47 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1617
 48 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1618
 49 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                                  '*  1619
 50 DATA 0, 0, 0, 0, 0, 6, 87, 180, 40, 205                            '*  1948
 51 DATA 33, 163, 86, 0, 30, 7, 191, 247, 0, 190                       '*  2214
 52 DATA 0, 0, 142, 222, 185, 64, 0, 252, 243, 165                     '*  2304
 53 DATA 190, 0, 1, 185, 10, 0, 243, 165, 14, 31                       '*  2198
 54 DATA 51, 192, 142, 192, 38, 161, 16, 4, 163, 82                    '*  2374
 55 DATA 0, 30, 161, 19, 4, 163, 84, 0, 191, 36                        '*  2171
 56 DATA 0, 30, 139, 5, 163, 78, 0, 38, 139, 69                        '*  2190
 57 DATA 2, 163, 80, 0, 184, 88, 0, 250, 30, 137                       '*  2224
 58 DATA 5, 30, 140, 77, 2, 251, 180, 9, 186, 244                      '*  2203
 59 DATA 1, 205, 33, 95, 7, 186, 139, 1, 30, 137                       '*  2234
 60 DATA 85, 14, 30, 140, 77, 16, 184, 0, 0, 195                       '*  2223
 61 DATA 13, 10, 10, 84, 49, 48, 48, 48, 32, 82                        '*  2175
 62 DATA 101, 98, 111, 111, 116, 32, 100, 114, 105, 118                '*  2539
 63 DATA 101, 114, 32, 100, 111, 97, 100, 101, 100, 46                 '*  2486
 64 DATA 32, 32, 32, 32, 32, 32, 60, 67, 116, 114, 108                 '*  2307
 65 DATA 45, 65, 108, 116, 45, 60, 101, 108, 62, 13                    '*  2372
 66 DATA 10, 32, 32, 32, 67, 111, 112, 121, 114, 105                   '*  2398
 67 DATA 103, 104, 116, 32, 49, 57, 56, 55, 32, 45                     '*  2325
 68 DATA 45, 32, 56, 48, 32, 77, 105, 99, 114, 111                     '*  2333
 69 DATA 32, 77, 97, 103, 97, 122, 105, 110, 101, 13                   '*  2415
 70 DATA 10, 10, 36, 87, 114, 105, 116, 116, 101, 110                  '*  2439
 71 DATA 32, 98, 121, 32, 68, 97, 118, 101, 32, 82                     '*  2326
 72 DATA 111, 119, 101, 108, 108                                       '*  1509  End
```

Program Listing 2. Reboot.ASM

```
        name    reboot
        page    55,80
        title   'REBOOT.SYS --- Tandy 1000 device to reboot quickly'

;                       REBOOT.ASM
;   When you press Ctrl-Alt-Del on a Tandy 1000, an involved reboot is
; initiated. (On the IBM only a short boot with no memory test occure.)
```

Listing continued

cro, November 1986, p.80, for details on the workings of the keyboard and interrupt hardware.) Reboot sends several end-of-interrupt signals to the interrupt-controller chip in case any lower-priority hardware interrupts are pending. Finally, Reboot initiates a warm boot with INT 19H.

Interrupts are kept enabled during Reboot's resident routine (with the STI instruction), so the the clock-tick interrupt (INT 8) can continue to update the system timer. All other hardware interrupts are lower priority; therefore, they are disabled until the end-of-interrupt signal is sent to the interrupt-controller chip.

Further Reading

If you're interested in this kind of programming, here are two books you'll find helpful: *Advanced MS-DOS*, by Ray Duncan (Microsoft Press, 1986), covers interrupt handlers, device drivers, and the booting process. *The Norton Programmer's Guide to the IBM PC*, by Peter Norton (Microsoft Press, 1985), covers interrupt handlers, system information stored in low memory, and other topics. ■

Dave Rowell is a staff writer for PC Resource *magazine. Write to him c/o* 80 Micro, *80 Elm St., Peterborough, NH 03458.*

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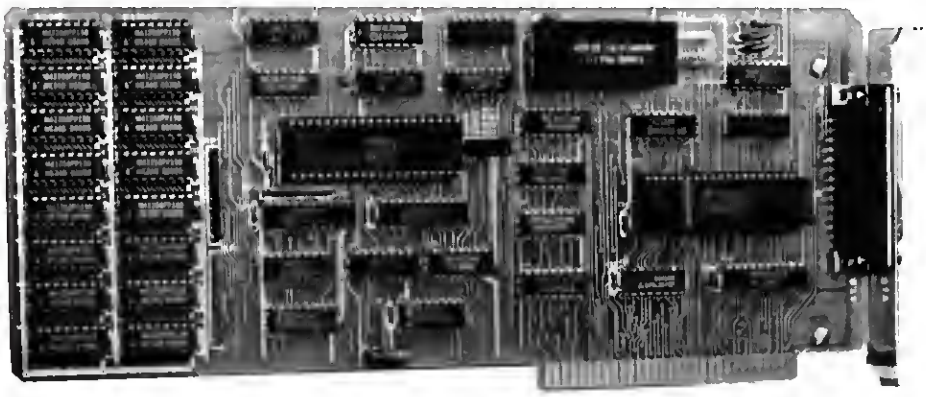

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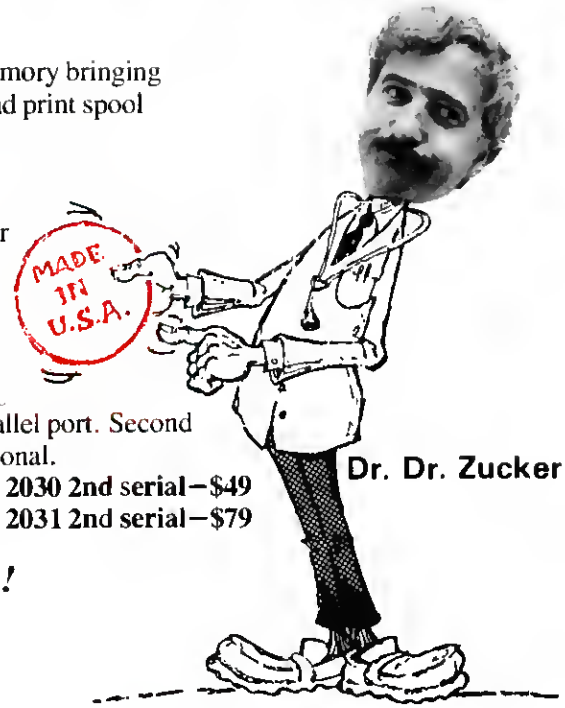

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Listing continued

```
; Many people with 640K of memory find waiting 16 seconds for a memory
; check annoying. This program (Reboot) monitors keyboard input, and
; performs a warm reboot when you press the reboot key combination.
;-----------------------------------------------------------------------

equipment_adr   equ     410H    ;offset from 0 of equipment list word
memorytop_adr   equ     413H    ;offset of top-of-memory word
keystatus_adr   equ     417H    ;offset of keyboard status byte (0:417H)
dos320bios_seg  equ     0070H   ;segment where DOS 3.20 IBMBIOS.COM resides
dos320flag_adr  equ     1fe3H   ;offset of DOS 3.20 INT 19H flag

code    segment public 'CODE'           ;code segment begins

REBOOT  proc    far

        org     0                       ;device drivers originate at 0

        assume  cs:code, ds:code, es:code

; Header for device driver.

header  dd      -1              ;-1 means end of list (DOS will change)
        dw      8000H           ;device attribute word (character device with
                                ;       no special properties)
        dw      strat           ;strategy entry point
        dw      intr            ;interrupt entry point
        db      'RBOOT   '      ;8-character device name (3 blanks at end)

; Local storage for DOS-passed request header address.

req_head        dd      ?

; Strategy routine for device driver stores address of request header
; passed in es:bx by DOS.

STRAT   proc    far

        mov     word ptr cs:[req_head],bx       ;request header offset
        mov     word ptr cs:[req_head+2],es     ;request header segment
        ret                                     ;far return to DOS

STRAT   endp

; Interrupt routine for device driver handles all function requests. It
; grabs necessary information from request header pointed to by req_head.
; This is a dummy driver. If the request command code in the header is 0
; (initialize), it sets up the Reboot resident keyboard interrupt handler
; in memory. This happens only once (during device installation). With any
; other code, a dummy routine sets the return status to done and returns.

INTR    proc    far

        push    ax
        push    bx
        push    cx
        push    dx
        push    si
        push    di
        push    ds
        push    es

        push    cs              ;use ds for local data
        pop     ds

        les     di,[req_head]   ;point es:di to request header
        mov     ax,0            ;set zero for initial status word
        mov     bl,es:[di+2]    ;put command byte in bl
        cmp     bl,0            ;is it zero (initialize)?
        jne     intout          ;if not then dummy device return
        call    install         ;install memory resident Reboot

intout: or      ax,0100H        ;set done bit (8) in status word
        mov     es:[di+3],ax    ;return status to request header
```

Listing continued

Listing continued

```
        pop     es
        pop     ds
        pop     di
        pop     si
        pop     dx
        pop     cx
        pop     bx
        pop     ax

        ret                     ;far return to DOS

; Resident Int 9 handler. If Ctrl-Alt-Del pressed, reboot initiates reset
; without memory check.

keyboardint     dd      ?               ;storage of previous BIOS INT 9 vector
equipment       dw      ?               ;storage of original equipment word
memorytop       dw      ?               ;storage of original top-of-memory
dosversion      dw      ?               ;version of MS-DOS

; The keyboard interrupt handler (short and quick) starts here.

keyboard:
        sti                     ;enable interrupts (only the clock)
        push    ax              ;used registers must be restored
        push    ds
        in      al,60H          ;read 8255A-5 (PPI) keyboard data
        cmp     al,53H          ;Is it Del key scan code?
        jne     out             ;if not the Delete key
        xor     ax,ax           ;point ds to memory bottom
        mov     ds,ax
        mov     al,ds: byte ptr keystatus_adr   ;get keyboard status byte
        and     al,12           ;mask for Ctrl and Alt bits (2&3)
        cmp     al,12           ;is Ctrl/Alt key combo active?
        je      reset           ;if yes, then reboot
out:    pop     ds
        pop     ax
        cli                     ;disable maskable interrupts
        jmp     cs:keyboardint  ;pass to old int. service routine

reset:  pop     ds              ;restore used registers
        pop     ax

; Restore ROM interrupt vector table from int_table. Zero out rest of vector
; area. ds:si is source and es:di is destination for string block moves.

        push    cs                      ;point ds to this segment
        pop     ds
        mov     si,offset int_table     ;ds:si is source (int_table)
        mov     di,0                    ;point es:di to 0:0--real vector table
        mov     es,di
        mov     cx,64                   ;move 64 words from table
        cld                             ;direction up
        cli                             ;no interrupts allowed while changing
rep     movsw                           ;block word move til cx=0
        sti                             ;reenable interrupts
        mov     cx,64                   ;going to fill next 64 words with 0
        mov     ax,0                    ;from AX
        cli
rep     stosw                           ;store 64 0 words, only di increments
        sti
        mov     cx,10                   ;move ten stored words
        cli
rep     movsw                           ;from ds:si to es:di
        sti
        mov     cx,374                  ;374 words in table above int 44H
        mov     ax,0                    ;fill with 0s
        cli
rep     stosw
        sti

; Restore original equipment list and top-of-memory word. (es still at 0.)

        mov     ax,equipment                    ;get stored word
        mov     es:word ptr equipment_adr,ax    ;put back in data area
```

Listing continued

Listing continued

```
        mov     ax,memorytop                    ;same with top-of-memory
        mov     es:word ptr memorytop_adr,ax

; If MS-DOS version 3.2, change INT 19H flag in RAM section of BIOS to zero.
; This section will have to be augmented for future versions of MS-DOS.

        mov     ax,dosversion           ;get dos version
        cmp     ax,1403H                ;jump if not 3.20 (al=3;ah=14H=20)
        jb      cls
        mov     ax,dos320bios_seg
        mov     es,ax
        mov     bx,dos320flag_adr
        mov     byte ptr es:[bx],0

; Clear screen with  BIOS video interupt (10H). (At this point, the BIOS
; interrupt is pure, and only the clock hardware interrupt is working.)

cls:    mov     ax,0002H        ;set video-80x25 black & white
        int     10H             ;BIOS video services call
        mov     ax,0600H        ;initialize (clear) screen
        mov     bh,7            ;gray on black
        mov     cx,0            ;upper left corner (0,0)
        mov     dx,184fH        ;to bottom right corner (24,79)
        int     10H

; Set up new stack area using top 128 words of interrupt vector table (used
; by ROM during booting). (128 words = 256 bytes = top 1/4 of table.)
; No interrupt can occur immediately after a 8088 segment register is changed,
; so no need for disabling interrupts between changing ss and sp.

        mov     ax,30H          ;segment 30H same as 0:300H
        mov     ss,ax
        mov     sp,100H         ;stack pointer is stack "bottom" (0:400H)

; Reenable keyboard input (via programmable peripheral interface-PPI) and
; send end-of-interrupt signal to programmable interrupt controller (PIC).

        cli                     ;disable interrupts
        in      al,61H          ;Port B of 8255A-5 PPI
        or      al,00H          ;toggle keyboard clear bit on
        out     61H,al          ;and
        and     al,7fH          ;off (bit 7 of Port B)
        out     61H,al
        mov     cx,3            ;count for eoi loop
eoi:    mov     al,20H          ;end of interrupt for 8259A PIC
        out     20H,al          ;(port 20H)--2 extra just in case lower
        loop    eoi             ;priority hardware interrupts are pending

        int     19H             ;ROM bootstrap loader (finally)

; Storage table for initial ROM vector table.

int_table       dw      64 dup (0)      ;room for the first 32 vectors
                dw      10 dup (0)      ;room for vectors 40-44

; Start of installation routine. Memory from here on will be released
; after initialization.

INSTALL proc    near

        push    es                      ;save address of request header
        push    di

; Get and store DOS version so that DOS versions 2 and 3 can be treated
; differently. This DOS function call is available at driver installation.
        mov     ah,30H                  ;DOS version function call
        int     21H
        mov     dosversion,ax

; Store ROM interrupt vectors (0-1F and 40,41 and 44 hex) in program table.

        push    ds                      ;point ea to this segment
        pop     es
```

Listing continued

Listing continued

```
        mov     di,offset int_table     ;point es:di to the table (dest.)
        mov     si,0                    ;point ds:si to 0:0 (source)
        mov     ds,si
        mov     cx,64                   ;move 64 words (32 2-word vectors)
        cld                             ;direction up
rep     movsw                           ;block word move
        mov     si,0100H                ;ds:si points to int vector 40
        mov     cx,10                   ;10 more words
rep     movsw                           ;es:di points to next table space
        push    cs
        pop     ds                      ;restore ds to this segment

; Store equipment byte and top-of-memory.

        xor     ax,ax                           ;point es to memory bottom
        mov     es,ax
        mov     ax,es: word ptr equipment_adr   ;get current equipment list
        mov     equipment,ax                    ;store here
        mov     ax,es: word ptr memorytop_adr   ;same for top-of-memory
        mov     memorytop,ax

; Get and save current address of INT 9 so that resident Reboot can pass
; control to the original interrupt routine. (es still at 0.)

        mov     di,4*9                          ;address of int 9
        mov     ax,es:[di]                      ;es still at 0
        mov     word ptr ds:keyboardint,ax      ;store int vector offset
        mov     ax,es:[di+2]
        mov     word ptr ds:keyboardint+2,ax    ;store int vector segment

; Reset low-level keyboard interrupt to point to Reboot routine.

        mov     ax,offset keyboard
        cli                             ;disable maskable interrupts
        mov     word ptr es:[di],ax     ;new offset
        mov     es:[di+2],cs            ;new segment
        sti                             ;reenable interrupts

; Display driver loading message.

        mov     ah,9
        mov     dx,offset message
        int     21H

; Set break address in request header to cut off installation procedure.
        pop     di                      ;recover request header address
        pop     es

        mov     dx,offset install       ;end of resident code
        mov     es:[di+14],dx           ;offset of driver end
        mov     es:[di+16],cs           ;segment of driver end

        mov     ax,0                    ;zero out status word

        ret                             ;near return

; Data for installation (nonresident).

message         db      13,10,10
                db      'T1000 Reboot driver loaded.     <Ctrl-Alt-Del>'
                db      13,10,'   Copyright 1987 -- 80 Micro Magazine'
                db      13,10,10,'$'
                db      'Written by Dave Rowell'

INSTALL endp

INTR    endp

REBOOT  endp            ;end of main routine
;-----------------------------------------------------------------------------
CODE    ends                    ;code segment ends

        end
```

End

Listing continued

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Leave the Printing

Set up a RAM buffer to free your Tandy 1000 while printing out files.

by David A. Williams

A spooler, one of the most useful utilities you can own, frees your computer to perform other tasks while your printer slowly grinds out the great American novel or the world's largest spreadsheet. A spooler can use a RAM buffer, a disk buffer, or a combination of the two.

Spooli (see the Program Listing) uses the first method. It places characters that would otherwise be sent directly to your printer into a reserved 64K block of memory. The characters remain in that block until your printer is ready to take them. Spooli then doles out characters to your printer while your computer appears to be devoting its full attention to its next task. Spooli includes commands that let you purge the buffer and make duplicate copies.

A print spooler should be transparent, meaning that, except for the fact that your documents appear to print much faster, everything should work as usual. A spooler should be fast, allow your printer to operate at normal speed, and be adaptable to your hardware configuration. It

System Requirements

Tandy 1000/1200/3000
Assembly language
Editor/assembler
Parallel printer

Illustrations by Earl Kelany

to Spooli

should not require an inordinate amount of memory and must have the features you need.

I tried several commercial spooler programs and did not find one that satisfied all of the above criteria. You might not like everything about Spooli, but you can easily customize it to fit your requirements.

I tried to keep Spooli simple. The program's buffer is fixed at 64K bytes and only services printers that are connected to the LPT1 parallel port. You can change the port address, but you cannot use Spooli to run two parallel printers or a serial printer.

How It Works

Spooli is memory-resident and consists of an initialization program, several routines that either replace or supplement existing interrupt routines, and a 64K buffer. The initialization routine runs once when you load the program. The routine uses DOS function calls 35 and 25 to replace the interrupt vectors for the timer interrupt, 08 hexadecimal (hex); the keyboard interrupt, 09 hex; and the basic input/output system (BIOS) printer interrupt, 17 hex.

The routine then calculates the buffer's starting address, ensures that it starts on a segment boundary, and tells DOS how much memory to reserve for the program and the buffer.

BIOS interrupt 17 hex has three functions: send a character, initialize a port, and test printer status. Spooli provides for all three functions, but the characters go into the buffer instead of going directly to the printer. Since the buffer does not need to be initialized, 17 hex merely reports printer status.

The buffer occupies one full segment, 64K bytes. Two pointers, In_PTR for input and Out_PTR for output, keep track of the data flow. I chose to use this size in order to simplify the design. When the pointers reach the top, FFFF hex, they overflow to 0000 hex and start over from the bottom. This circular organization allows Spooli to handle print jobs that are larger than 64K, but it cannot free your computer until less than 64K of text remains to be printed.

A counter, BUF_CNT, keeps track of how many characters are in the buffer. The data in BUF_CNT is redundant (you can derive it from the contents of the two pointers). Only two BUF_CNT values are of interest: 0000 and FFFF hex. The former tells you that there are no more characters to send while the latter says, "Wait, the buffer is full!"

Before storing a character, Spooli checks to make sure that the buffer is not already full. If it is full, the program loops until the printer takes some data from the buffer and makes room for more. This means that the program hangs here if the printer is off line and the output exceeds 64K of text.

Spooler programs could be made more efficient if there were an interrupt that signaled when the printer was ready to accept another character. The BIOS provides for such an interrupt, but most computers are not wired to use it and require another approach. Spooli uses the timer interrupt.

Eighteen times a second, a clock signal interrupts the computer to update the counters that are keeping the time of day. Spooli intercepts the timer interrupt and steals a few milliseconds to send characters to your printer, using the interrupt 17 hex routine, before jumping to the timer interrupt routine. After it sends each character, Spooli updates Out_PTR and BUF_CNT.

Printing would take forever if Spooli printed only one character each time it called the output routine. To output a reasonable amount of text in one batch, yet keep your computer from getting hung up if your printer goes off line, Spooli loops through the output routine. It counts the passes, whether or not a character is sent, and exits when the count equals the value of the constant Cycles, currently set at 100.

This Cycles value of 100 causes the computer to spend about a third of its time servicing the printer and works well with printers that have only a single-line buffer. If your printer has a larger buffer, you can make the value of Cycles smaller. This permits your computer to spend more time doing other things without slowing down the printer.

Although a spooler should be able to run automatically, you must have external control. Spooli provides a purge command, alternate-P, which empties the buffer and resets the pointers to zero. The program also contains a duplicate command, alternate-D, which lets you make additional copies. You can execute these commands from within programs or from the DOS prompt.

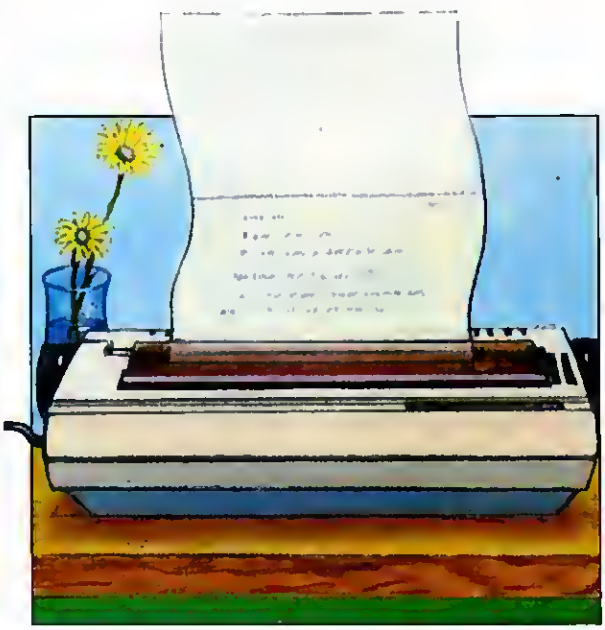
Controlling Spooli

The control routine intercepts the keyboard interrupt, 09 hex, and looks for alternate-P or alternate-D key combinations. When it detects either one, it calls the appropriate routine. If this choice of commands interferes with any of your programs, you can select another combination.

You can use the purge command anytime, but if you do so while your program is printing, the buffer continues to fill. The duplicate command only works on documents that are smaller than 64K for which you executed the purge command before starting your printing job. You can also use the duplicate command to stop and then restart a print operation if the paper becomes jammed or some other calamity occurs.

Easy Restart

You can restart at any time. To begin printing again, simply take your printer



off line, solve the problem, press alternate-D, and put your printer back on line. Make sure your printer is turned on before starting a print operation. Sometimes the computer output port cannot distinguish between a dead line and a ready signal.

Assembling Spooll

Spooli is designed to be assembled and then converted to a COM file. The following commands, which you can place in a batch file, will perform the tasks if you are using the Microsoft macro assembler, MASM.

```
ECHO OFF
MASM %1;
LINK %1;
DEL %1.OBJ
EXE2BIN %1 %1.COM
DEL %1.EXE
```

Name the source file Spooli.ASM, the batch file ASM.BAT, and type ASM SPOOLI to start the process. Ignore the warning message that your computer will display concerning a missing stack sector.■

David A. Williams is a staff engineer with a major aerospace firm and has 25 years of experience with computers. Write to him at 2452 Chase Circle, Clearwater, FL 33546.

Program Listing. Spooli.

```
;    SPOOLER PROGRAM, David Williams

CYCLES    EQU     100         ;NUM OF LOOPS THRU OUTPUT ROUTINE

;Data area containing keyboard buffer and status word
BIOS_DATA SEGMENT  AT  40H
          ORG 1AH
HEAD      DW      ?
TAIL      DW      ?
BUFFER    DW      15 DUP(?)
BUFF_END  DW      ?
BIOS_DATA ENDS
CSEG      SEGMENT
          ASSUME  CS:CSEG,ES:CSEG,DS:CSEG
          ORG     100H
BEGIN:    JMP     INIT
;Counters, pointers, and other data
DATA_SEG          DW   0       ;BUFFER SEGMENT ADDRESS
OUT_PTR           DW   0       ;OUTPUT POINTER
IN_PTR            DW   0       ;INPUT POINTER
BUF_CNT           DW   0       ;AMOUNT OF DATA IN THE BUFFER
OLD_TIMER         DD   0       ;ORIGINAL TIMER INT VECTOR
OLD_KYBD_INT      DD   0       ;ORIGINAL KYBD INT VECTOR
PRINT             DD   0       ;ORIGINAL PRINTER INT VECTOR
;Routine called by kybd input to purge buffer, duplicate output
CONTROL   PROC    FAR
          ASSUME DS:BIOS_DATA
          STI
          PUSH    BX
          PUSH    DS
          PUSH    AX
;Input data from the keyboard and look for control characters
          PUSHF
          CALL    OLD_KYBD_INT
          MOV     AX,BIOS_DATA
          MOV     DS,AX
          MOV     BX,TAIL              ;FIND CHARACTER
          SUB     BX,2
          CMP     BX,OFFSET BUFFER
          JAE     NO_WRAP
          MOV     BX,OFFSET BUFF_END
NO_WRAP:  MOV     AX,[BX]              ;GET CHARACTER
          CMP     AX,2000H             ;IS IT ALT-D?
          JZ      DUPE
```

Listing continued

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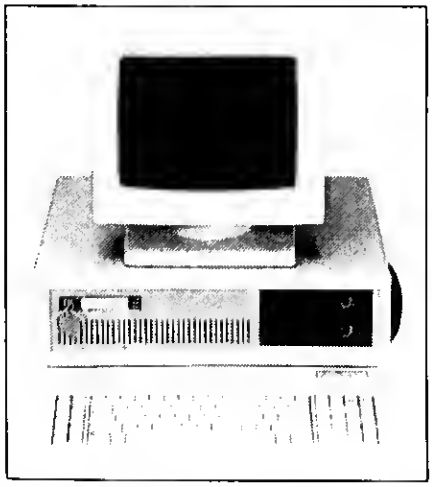

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Listing continued

```
                CMP     AX,1900H                ;IS IT ALT-P
                JZ      PURGE
NEXT:           POP     AX
                POP     DS
                POP     BX
                IRET
;Purge spool buffer
PURGE:          CLI
                MOV     CS:OUT_PTR,0    ;RESET
                MOV     CS:IN_PTR,0     ; THE
                MOV     CS:BUF_CNT,0    ;  COUNTERS
                JMP     FINI
;Duplicate output or restart
DUPE:           CLI
                MOV     AX,CS:IN_PTR    ;START
                MOV     CS:BUF_CNT,AX   ; OVER
                MOV     CS:OUT_PTR,0    ;  FROM BOTTOM
FINI:           STI
                MOV     TAIL,BX
                JMP     NEXT
CONTROL         ENDP
;Input routine, replaces INT 17H routine
INPUT           PROC    FAR
                STI                     ;RESTART INTERRUPTS
                OR      AH,AH           ;SET FLAGS
                JZ      STORE           ;CHAR TO BUFFER
                DEC     AH              ;TEST FOR AH=1
                JZ      PRTSTAT         ;INITIALIZE PORT
                DEC     AH              ;TEST FOR AH=2
                JZ      PRTSTAT         ;GET PRINTER STATUS
                IRET
;Accept character, but store instead of print
STORE:          PUSH    SI
                PUSH    DS
                CALL    SAVE            ;PUT THE CHAR IN THE BUFFER
                POP     DS
                POP     SI
PRTSTAT:        CMP     CS:BUF_CNT,0FFFFH       ;IS BUFFER FULL ?
                JZ      BUSY
                MOV     AH,90H                  ;SELECTED, NOT BUSY
                IRET
BUSY:           MOV     AH,10H                  ;SELECTED, BUSY
                IRET
INPUT           ENDP
;Routine to put character in buffer
SAVE            PROC    NEAR
                CMP     CS:BUF_CNT,0FFFFH       ;BUFFER FULL?
                JZ      SAVE                    ;YES, WAIT
                CLI
                MOV     DS,CS:DATA_SEG          ;SET DS TO BUFFER SEGMENT
                MOV     SI,CS:IN_PTR            ;GET INSERT POINTER
                MOV     [SI],AL                 ;SAVE CHAR
                INC     CS:IN_PTR               ;INC POINTER
                INC     CS:BUF_CNT              ;INC COUNTER
                STI
                RET
SAVE            ENDP
;Output routine.  Attached to front of timer int routine
OUTPUT          PROC    FAR
                CMP     CS:BUF_CNT,0            ;ANYTHING TO PRINT?
                JNZ     GO
                JMP     CS:[OLD_TIMER]
GO:             STI                             ;RESTART INTERRUPTS
                PUSH    AX
                PUSH    CX
                PUSH    DX
                PUSH    SI
                PUSH    DS
                PUSH    ES
                PUSH    CS
                POP     DS                      ;SET DATA SEGMENT
                MOV     CX,CYCLES               ;SET NUMBER OF TIMES TO LOOP
;Check printer status
REPEAT:         MOV     AH,02                   ;INT 17H, RETURN STATUS
                MOV     DX,0                    ;SELECT LPT1
                PUSHF                           ;TO MATCH IRET IN INT17H
```

Listing continued

Listing continued

```
                CALL    PRINT                   ;CALL OLD PRINT ROUTINE
                TEST    AH,80H                  ;TEST FOR BUSY
                JNZ     CONT                    ;NOT BUSY
                CMP     CX,CYCLES               ;HAS IT EVER BEEN READY
                JNZ     LOOP                    ;YES, CONTINUE
                JMP     EXIT                    ;NO, EXIT
;Print a character
CONT:           CLI                             ;TURN OFF INTERRUPTS
                MOV     SI,OUT_PTR
                MOV     ES,DATA_SEG             ;GET BUFFER SEG ADDR
                MOV     AL,ES:[SI]              ;GET CHAR FROM BUFFER
                INC     OUT_PTR                 ;INC OUTPUT POINTER
                DEC     BUF_CNT                 ;ADJUST BUFFER COUNT
                MOV     AH,0                    ;OUTPUT A CHARACTER
                PUSHF                           ;MATCH IRET
                CALL    PRINT                   ;CALL OLD PRINT ROUTINE
                STI
                CMP     BUF_CNT,0               ;IS THE BUFFER EMPTY
                JZ      EXIT                    ;EXIT IF SO
LOOP:           LOOP    REPEAT                  ;LOOP
EXIT:           POP     ES
                POP     DS
                POP     SI
                POP     DX
                POP     CX
                POP     AX
                CLI
                JMP     CS:[OLD_TIMER]          ;JUMP TO OLD TIMER INT
OUTPUT          ENDP
                DB 16 DUP(?)                    ;GUARD SPACE
;Initialization routine, runs when spooler is loaded
INIT PROC NEAR
;Initialize printer port
                MOV     AH,01
                MOV     DX,0
                INT     17H
;Get current timer interrupt vector
                MOV     AX,3508H
                INT     21H                             ;GET THE VECTOR
                MOV     WORD PTR OLD_TIMER,BX           ;SAVE THE OFFSET
                MOV     WORD PTR OLD_TIMER+2,ES         ;SAVE THE SEGMENT
;Set timer interrupt vector to output routine
                MOV     AX,2508H                        ;DOS REQUEST
                MOV     DX,OFFSET OUTPUT                ;POINTER TO OUR ROUTINE
                INT     21H
;Get current kybd interrupt vector
                MOV     AX,3509H
                INT     21H                             ;GET THE VECTOR
                MOV     WORD PTR OLD_KYBD_INT,BX        ;SAVE THE OFFSET
                MOV     WORD PTR OLD_KYBD_INT+2,ES      ;SAVE THE SEGMENT
;Set kybd interrupt vector control routine
                MOV     AX,2509H                        ;OOS REQUEST
                MOV     DX,OFFSET CONTROL               ;POINTER TO OUR ROUTINE
                INT     21H
;Get current print interrupt vector
                MOV     AX,3517H                ;GET IT
                INT     21H
                MOV     WORD PTR PRINT,BX       ;SAVE IT
                MOV     WORD PTR PRINT+2,ES
;Set INT 17H vector to input routine
                MOV     AX,2517H                ;DOS REQUEST
                MOV     DX,OFFSET INPUT         ;POINTER TO OUR ROUTINE
                INT     21H
;Compute buffer segment address and allocate memory
                MOV     DX,OFFSET INIT          ;POINT TO START OF INIT
                MOV     CL,04                   ;AMOUNT TO SHIFT RIGHT
                SHR     DX,CL                   ;DO IT
                MOV     AX,CS                   ;GET CURRENT CODE SEGMENT
                ADD     AX,DX                   ;ADD OFFSET TO INIT
                MOV     DATA_SEG,AX             ;BUFFER SEGMENT ADDRESS
                ADD     DX,1001H
                MOV     AL,0                    ;NORMAL EXIT CODE
                MOV     AH,31H                  ;QUIT AND STAY
                INT     21H
INIT            ENDP
CSEG            ENDS
                END BEGIN
```

End

Circle 175 on Reader Service Card.

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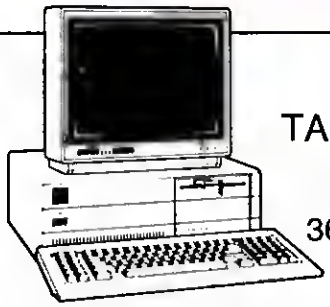

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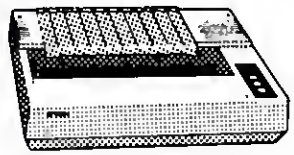

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Caught in a Time Stamp

Automatically time-stamp your Basic programs for future reference.

If you program in Basic, you've probably been confused when searching for the last update of a file, or wondered when you last worked on a program. TRSDOS date-stamps your files on the disk directory, and MS-DOS both date- and time-stamps directory files. My program, TRS Stamp, automatically puts a time-stamp at the beginning of your program listings for further convenience.

Using TRS Stamp

TRS Stamp (see the Program Listing) is a Basic routine that runs on the Model 4 and Tandy 1000. It also runs on the Models I/III with changes listed later. It is short and easy to implement. You can modify TRS Stamp to insert information other than the time, but unless that information changes often, there is no real advantage to doing so.

Once you have appended TRS Stamp to the end of your program, insert the time-stamp line at the beginning of the program. To activate TRS Stamp, break out of your program and type GOTO x, where x is the line number at which you appended the routine. Then save your program to disk.

You must run your program to initialize the variable tables before you break out. Typing GOTO x without having done so will not work.

Anatomy of TRS Stamp

Line 1 does not have to be the first line of your program. It is, however, easy to list in Basic, and you can review it from the TRSDOS Ready (or MS-DOS's A>) prompt with the List (or Type) command. You can put the line anywhere you want. You can call the variable for a "Last updated xx/xx/xx" notice in the program. It is important, however, that the space allowed for the update area match the length of the combined date and time line.

The subroutine only accepts replacement characters up to the length of the dummy string.

The VARPTR call in line 65000 determines the location of the string. The VARPTR points to the actual location of the string in the program line because the variable is a constant. Line 65020 determines the actual address of the string.

Line 65030 sets up the replacement string. You can damage your program by overrunning the length of the dummy string with a too-long replacement string. The subroutine in line 65040, therefore, only accepts replacement characters up to the length of the dummy string. It does this by using the length of string parameter in the VARPTR function.

Line 65050 is perhaps the most confusing. The parameters for Poke and Peek commands are restricted to integers, so they must fall within the −32,767 to 32,767 range. If you require a number larger than 32,767 for poking or peeking, you must subtract 65,536 from it to get a valid integer.

Line 65060 inserts the replacement line, character by character, into the spaces allocated by the dummy string.

Line 65070 is the For. . .Next loop closure for line 65040.

Suggestion for Successful Stamping

You can compress TRS Stamp into two or three lines, but unless you are cramped for space, it is simpler to run the routine as is and then delete it at the end of the program-development procedure. You can merge TRS Stamp from disk if the line numbers are suitable and you saved the routine in ASCII format.

TRS Stamp modifies the program to which it is attached. Make certain that the string variable for the date-stamp is unique in that program and save a copy of the program prior to executing TRS Stamp. After executing the routine, list your program on the screen for a quick visual check.

Model I/III Changes

To make TRS Stamp work on the Model I/III, change line 65040 to read:

```
65040 FOR T = 1 TO PEEK(C) - 1
```

Also, change the DZZ$ and ADDRS variables to two-letter variables. ■

Lionel P. Tercier has been programming in Basic on Tandy computers for several years and is a professional photographer. Write to him at Box 2430, Bonnyville, Alberta, Canada T0A 0L0.

System Requirements

Model 4 or Tandy 1000/1200/3000
(Models I/III with changes)
Basic
Available on The Disk Series

Program Listing. TRS Stamp.

```
1 DZZ$="THIS IS THE UPDATE" ' Make space for dateline                '*  1734
65000 C=VARPTR(DZZ$)                                                 '*  1255
65010 ' Determine address of variable
65020 MSB= PEEK(C+2)*256:LSB= PEEK(C+1) : ADDRS = MSB+LSB            '*  3353
65030 G$=DATE$+"  "+TIME$  '  Get current date and time               '*  1333
65040 FOR T=1 TO PEEK(C) '  Length is set by VARPTR                   '*  1412
65050   H=(ADDRS+T-1):IF H>32767 THEN H=H-65536                      '*  2667
65060   POKE H,ASC(MID$(G$,T,1)) ' Insert into program line          '*  1763
65070 NEXT T                                                         '*   725
```

End

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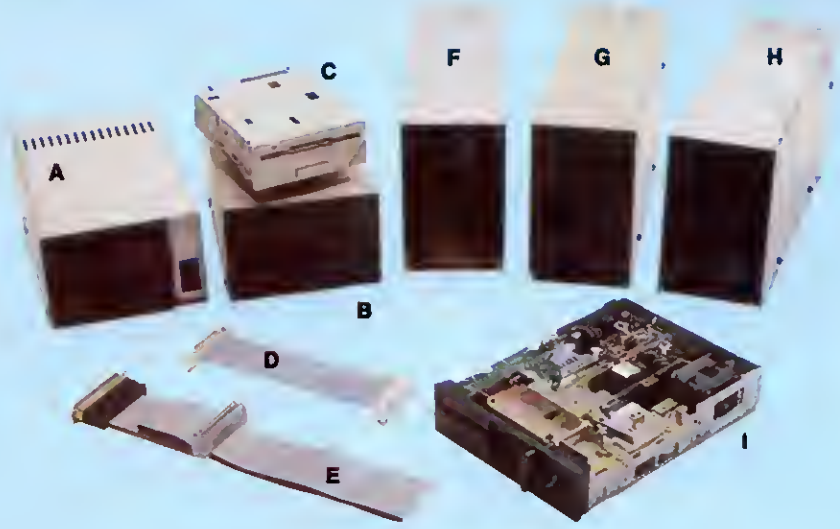

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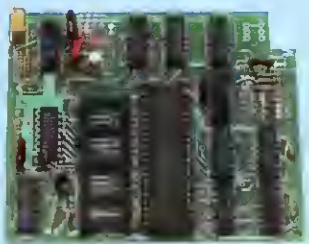

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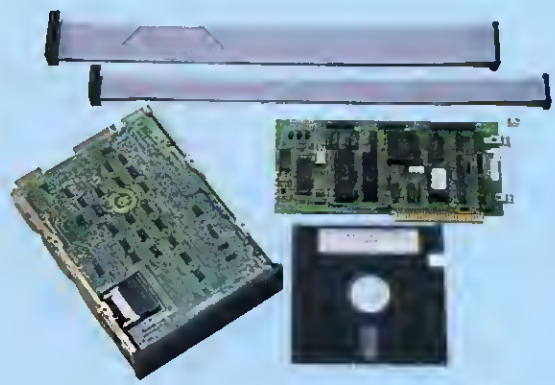

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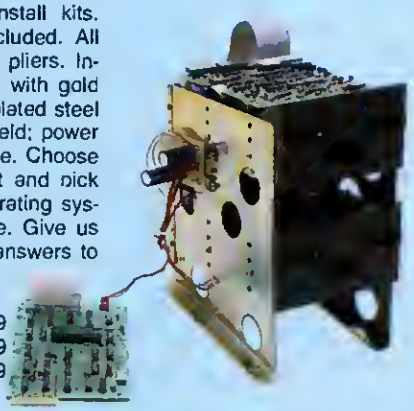

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A Quick Comparison

Display any two Model 4 text files simultaneously and compare them line by line.

In the course of programming, I usually wind up with several versions of the same program. At some point I need to find the precise differences between these versions and make some reason of the rhyme. Reviewing printed copies of the two programs is out of the question. I wrote Compare Plus, a comparing line editor for the Model 4 that lets you look at any two line-oriented text files simultaneously.

Compare Plus does not modify the files. You control the scan as Compare Plus compares identical areas, but the scan stops when a difference is detected. Your comments entered form the keyboard and selected lines from either file are sent to the printer, giving you data for analysis. Compare Plus reads files written in any programming language and saved in ASCII.

I wrote Compare Plus using Misosys's EDAS editor/assembler (see the Program Listing), commenting the program at key points. You can assemble it with EDAS or Pro-Create. Other assemblers might require syntax modifications. In assembled form, Compare Plus is a 1,123-byte (4½-sector) CMD file.

In operation, the first file appears on the top half of the screen, and the second file appears on the bottom of the screen (see Photo). The screen displays nine lines from each. As you tap the spacebar, Compare Plus reads one more line from each file, scrolls up the existing displays, adds the new lines at the bottom of each, and makes a byte-for-byte comparison of these last two lines. Compare Plus scans identical lines from two files at about 800 lines per minute.

As long as the lines are identical, the comparing scan proceeds freely. When there is a difference, the scan stops and you can analyze and record the discrepancy. To assist this analysis, you can scroll through either file forward or backward.

Since Compare Plus accesses the disk frequently, particularly during the reverse scroll, you will get better performance if you place one or both of the files to be compared on a Memdisk.

Photo. Split screen allows you to compare two files.

Using Compare Plus

Assemble Compare Plus as CED/CMD. You have several ways to invoke Compare Plus, so I'll give some examples. First, suppose you want to compare two EDAS files. No parameters are necessary. At the TRSDOS Ready prompt enter:

```
CED    file1/ASM:1    file2/ASM:2
```

If you do not include a drive number, TRSDOS finds the file on the first available drive, and Compare Plus's screen display shows the drive. If you don't include the filespecs on the command line, Compare Plus prompts you for them.

Compare Plus looks for an end-of-file (EOF) marker to terminate and return to DOS. EDAS and its successors use X'1A' (26 decimal), and this is the default value for Compare Plus. Scripsit and many other editors use 00 hexadecimal (hex) as the EOF marker, and Basic programs saved in ASCII also have a zero EOF.

If in doubt, list the file using the hex parameter and look at the last few bytes. The last line should be terminated by an X'0D' followed by 1 or 2 bytes. The first byte following the last X'0D' is the EOF marker. If your EOF marker is, for example, X'1C', specify it as a parameter when you invoke Compare Plus:

```
CED file1/SRC:1 file2/SRC:2 (EOF=X'1C') or (EOF=28)
```

EDAS can save a file with or without line numbers. With an EDAS line-numbered file, Compare Plus uses those line numbers, otherwise Compare Plus generates line numbers starting with 100, incrementing by 10. When the file contains line numbers, Compare Plus displays a pound (#) sign in front of the filespec. Compare Plus works even if one file is numbered and the other is not. The byte-for-byte comparison only involves the actual text of the line, since the line numbers have no effect in assembly.

To compare two versions of a Basic pro-

Key	Label	Function
spacebar	NEXT	Read one line from each file and compare
S or s	SCAN	Toggle automatic scan on and off When scan is on comparison is done
1	LN1	Last line for file 1 to printer (comparison)
2	LN2	Last line for file 2 to printer (comparison)
C or c	COMNT	Enter a comment from the keyboard and send to the printer (comparison)
break	EXIT	Exit to DOS
up arrow	ADV1	Advance file 1 by one line (no comparison)
down arrow	ADV2	Advance file 2 by one line (no comparison)
clear-up arrow	REV1	Reverse file 1 by one line (no comparison)
clear-down arrow	REV2	Reverse file 2 by one line (no comparison)

Table. Compare Plus Commands.

System Requirements

Model 4
64K RAM
Editor/assembler
Printer optional
Available on The Disk Series

gram, you must save both in ASCII and specify Compare Plus's Basic parameter, which you can abbreviate:

CED file1/BAS:1 file2/BAS:2 (B)

Specifying this parameter suppresses Compare Plus's automatic line numbering and sets the EOF marker to zero. Furthermore, the byte-for-byte comparison now includes the line numbers.

You can use the B parameter on any file to avoid automatic line numbering.

Compare Plus will not display or compare text past its 80-character-per-line limit. Be aware of this restriction when comparing Basic files.

You can use the B parameter on any file to avoid the automatic line numbering. Note also that the EOF parameter overrides the zero associated with the Basic parameter. Thus:

CED file1/txt:1 file2/txt:2 (B,EOF=26)

suppresses the line numbers but still looks for an EOF marker of X'1A'.

Compare Plus also keeps a line count for each file and displays these numbers to the right of each filespec. The line count refers to the last-read line and decreases as the file is reversed.

Command Details

Once Compare Plus has the two files, you have 10 commands at your disposal (see the Table). The most important is the "next" command, which advances both files by one line. You can rapidly review long, identical sections by holding down the spacebar. If you want more careful visual review, tap the spacebar for single-line advance.

For the most rapid comparison, use the scan command, which supplies a X'20' (spacebar) character automatically after each line comparison. The scan stops when Compare Plus finds a difference in the two files. When scan is in effect, an S displays in the middle line to the right of the line count. The S key toggles the scan function on and off.

When Compare Plus detects a difference in the two files, the scan stops (the spacebar is inoperative), and a blinking asterisk appears in the center of the screen. Review the lines that differ and take whatever action is indicated. You can access all nine of the other commands at this point or exit the hold by pressing any other key.

As noted in the Table, you control in-

Program Listing. Compare Plus.

```
00100           TITLE   '<CED - Comparing line editor>'
00110 ;for Model 4 with TRSDOS 6.2
00120 ;by James L. Hawes
00130 @KEY      EQU     1
00140 @DSP      EQU     2
00150 @KEYIN    EQU     9
00160 @DSPLY    EQU     10
00170 @PRINT    EQU     14
00180 @VDCTL    EQU     15
00190 @PARAM    EQU     17
00200 @EXIT     EQU     22
00210 @ERROR    EQU     26
00220 @OPEN     EQU     59
00230 @READ     EQU     67
00240 @FSPEC    EQU     70
00250 SVC       MACRO   #SVC
00260           LD      A,#SVC
00270           RST     28H
00280           ENDM
00290           ORG     2700H
00300 PTAB      DB      80H     ;begin parameter table
00310           DB      55H     ;demand flag entry
00320           DB      'BASIC'         ;default is off
00330           DB      0               ;surpress line numbers
00340           DW      BASIC+1         ;and set EOFM to 00
00350           DB      03H     ;demand numeric entry
00360           DB      'EOF'           ;to set EOFM
00370           DB      0               ;default is 1AH
00380           DW      EOF+1
00390           DB      0
00400 ENTRY     PUSH    HL              ;search for possible
00410           LD      A,(HL)          ;parameters first
00420           INC     HL
00430           CP      0DH
00440           JR      Z,NPARM
00450           CP      '('
00460           JR      NZ,ENTRY+1
00470           DEC     HL
00480           LD      DE,PTAB
00490           SVC     @PARAM
00500           JP      NZ,ERROR
00510 NPARM     LD      HL,SCRNB        ;blank out screen buffer
00520           LD      DE,SCRNB+1      ;from 2C00 to 337F
00530           LD      BC,77FH
00540           LDIR
00550           POP     HL              ;recover command line
00560           LD      A,(HL)          ;and look for filespec 1
00570           CP      40H
00580           CALL    C,ENFIL1        ;none given so request it
00590           LD      DE,MSGFS1       ;move filespec to screen
00600           PUSH    HL              ;and on return HL will
00610           CALL    MOVFN           ;point to ':'
00620           LD      (DRV1),HL       ;save till drv # known
00630           POP     HL
00640           LD      DE,FCB1         ;open file 1 with
00650           SVC     @FSPEC          ;input buffer 2600
00660           LD      A,13H           ;to 26FF
00670           JR      NZ,ERJP
00680           PUSH    HL              ;save command line
00690           LD      B,0
00700           LD      HL,2600H
00710           SVC     @OPEN
00720           JR      NZ,ERJP
00730           LD      A,(FCB1+6)      ;get drive # found
00740           ADD     A,30H
00750           LD      HL,0
00760 DRV1      EQU     $-2             ;HL => ':' if present
00770           LD      (HL),':'        ;if drive # was entered
00780           INC     HL              ;on command line, this
00790           LD      (HL),A          ;simply overwrites
00800           INC     HL              ;with identical info
00810           LD      (HL),20H
00820           PUSH    DE
00830           POP     IX              ;IX => FCB1
00840           POP     HL              ;remaining command line
00850           LD      A,(HL)
00860           CP      40H
00870           CALL    C,ENFIL2        ;similar to file 1
00880           LD      DE,MSGFS2
00890           PUSH    HL
00900           CALL    MOVFN
00910           LD      (DRV2),HL
00920           POP     HL
00930           LD      DE,FCB2         ;open file 2 with
00940           SVC     @FSPEC          ;input buffer 2700
00950           LD      A,13H           ;to 27FF
00960           JR      NZ,ERJP
00970           LD      B,0
00980           LD      HL,2700H
00990           SVC     @OPEN
01000 ERJP      JP      NZ,ERROR
01010           LD      A,(FCB2+6)
01020           ADD     A,30H
01030           LD      HL,0
01040 DRV2      EQU     $-2
01050           LD      (HL),':'
01060           INC     HL
01070           LD      (HL),A
01080           INC     HL
01090           LD      (HL),20H
01100           PUSH    DE
```

Listing continued

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dividual advance of the files with the up- and down-arrow keys. To get the reverse scroll, hold the clear key and tap the appropriate arrow key. Do not reverse-read a file to its first line, because this locks up Compare Plus on sector zero, and you must press break to exit.

The four individual scroll commands return to the command key without any comparison. This allows unhindered search. Upon return from the other four commands, next, print 1, print 2, and comment, Compare Plus again compares the last two lines, and the blinking asterisk appears if they differ. If you wish to avoid the repeated comparison and resulting hold following the two-line prints and the comment, increase the value in line 3640 from six to 10.

Compare Plus displays a blinking asterisk if the last two lines differ.

If the difference appears to be a minor change to a single line, you might want to record the two lines. Pressing the 1 key sends the last line from the top file to the printer and the 2 key sends the last line from the bottom file. Compare Plus labels these printed lines as either "File 1" or "File 2."

Reverse Scrolls

Compare Plus performs the reverse scrolls by searching through the files for the beginning of the 10th line preceding the current line. It then reads nine lines and scrolls upwards. All of this action is carried out on a mapped buffer, and only the final result appears on the video. If Compare Plus displays lines 250–330, reversing once displays lines 240–320. This is done without any confusing movement and repeats it at a respectable 280 lines per minute.

Frequently, the difference between the files is due to added lines. When this happens, you can scroll forward and in reverse through each file separately as needed. You might want to send several lines to the printer and make one or more comments to your printout. As you type a comment line, it appears on the bottom line of the screen. Press enter to terminate a comment. The left-arrow key is a backspace. The comment line is limited to 79 characters plus the enter key, but you can use as many lines as you need.

Use the individual scrolls to get the two files back into sync. Individual scrolling can easily handle situations such as a group of lines moved from one area of the program to another, or two different files containing the same sizable subroutine, where you want to see whether two routines are identical.

I have written an LDOS 5.x Model III version of Compare Plus. Unfortunately, space is too limited to publish it here. It is available, however, on The *80 Micro* Disk Series. See p. 6 for details.■

James L. Hawes has done extensive amateur programming for several years. Send your questions and comments to him at 1781 Lafrentere St., New Orleans, LA 70122.

Listing continued

```
01110           POP     IY              ;IY => FCB2
01120           LD      C,14
01130           SVC     @DSP            ;turn on cursor
01140           JP      START   ;get above 27FF to use buffers
01150 MOVFN     SVC     @FSPEC
01160           LD      H,D
01170           LD      L,E
01180 MOV1      INC     HL
01190           LD      A,(HL)
01200           CP      3
01210           RET     Z       ;if find 03, no drive given
01220           CP      ':'
01230           RET     Z
01240           JR      MOV1
01250 ENFIL2    LD      HL,TWO  ;HL=>prompt message
01260           LD      BC,MSGFS2       ;BC=>where to put it
01270           JR      ENFIL3
01280 ENFIL1    LD      HL,ONE
01290           LD      BC,MSGFS1
01300 ENFIL3    SVC     @DSPLY
01310           LD      H,B
01320           LD      L,C
01330           LD      BC,1F00H
01340           SVC     @KEYIN
01350           JP      C,EXIT  ;<BRK> causes exit
01360           RET
01370 FCB1      EQU     2800H
01380 FCB2      EQU     2820H
01390           ORG     2840H
01400 ERROR     OR      40H     ;error causes exit
01410           LD      C,A
01420           SVC     @ERROR
01430 EXIT      LD      BC,85FH         ;replace cursor with
01440           SVC     @VDCTL          ;underline
01450           LD      HL,0
01460           SVC     @EXIT
01470 DECNUM    PUSH    DE
01480           LD      DE,DECTAB
01490 DEC1      LD      A,(DE)
01500           LD      C,A
01510           INC     DE
01520           LD      A,(DE)
01530           LD      B,A
01540           INC     DE
01550           PUSH    DE
01560           LD      A,0AFH
01570 DEC2      INC     A
01580           LD      D,H
01590           LD      E,L
01600           ADD     HL,BC
01610           JR      C,DEC2
01620           POP     HL
01630           EX      (SP),HL
01640           EX      DE,HL
01650           CALL    DSP
01660           EX      DE,HL
01670           EX      (SP),HL
01680           EX      DE,HL
01690           INC     C
01700           JR      NZ,DEC1
01710           POP     DE
01720           LD      A,20H
01730           JP      DSP
01740 DECTAB    DW      -10000
01750           DW      -1000
01760           DW      -100
01770           DW      -10
01780           DW      -1
01790 DSP       CP      9
01800           JR      Z,DTAB
01810           AND     7FH     ;strip bit 7
01820 DSP1      LD      (DE),A
01830           INC     DE
01840           PUSH    DE      ;check for end of line
01850           PUSH    HL
01860           EX      DE,HL
01870           LD      DE,-SCRNB       ;subtract begining
01880           ADD     HL,DE           ;of screen buffer
01890           LD      DE,50H
01900           XOR     A
01910           SBC     HL,DE
01920           JR      NC,$-2
01930           ADD     HL,DE   ;HL = position in line
01940           LD      A,H
01950           OR      L       ;zero if end of line
01960           POP     HL
01970           POP     DE
01980           RET
```

Listing continued

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```
01990 DTAB    LD      A,20H
02000         CALL    DSP1
02010         RET     Z
02020         LD      A,E             ;tab to positions
02030         ADD     A,2             ;(@-2)+@*n
02040         AND     7
02050         JR      NZ,DTAB
02060         LD      A,D
02070         OR      E
02080         RET
02090 READ1   PUSH    DE
02100         LD      DE,FCB1
02110         LD      (IX+10),A       ;position NRN
02120 RD1     SVC     @READ
02130         POP     DE
02140         RET
02150 READ2   PUSH    DE
02160         LD      DE,FCB2
02170         LD      (IY+10),A
02180         JR      RD1
02190 GET     LD      A,D     ;if DE < 3000 must be file 1
02200         CP      30H
02210         JR      NC,GET2
02220 GET1    LD      HL,2600H        ;current buffer position
02230 BPOS1   EQU     $-2
02240         LD      A,(HL)
02250         INC     L
02260         LD      (BPOS1),HL      ;update position
02270         JR      NZ,GETRN+1
02280         PUSH    AF      ;if L is @@ need next sector
02290         LD      A,(IX+10)
02300         CALL    READ1           ;read next sector
02310         JR      GETRN
02320 GET2    LD      HL,2700H
02330 BPOS2   EQU     $-2
02340         LD      A,(HL)
02350         INC     L
02360         LD      (BPOS2),HL
02370         JR      NZ,GETRN+1
02380         PUSH    AF
02390         LD      A,(IY+10)
02400         CALL    READ2
02410 GETRN   POP     AF              ;recover input byte
02420         CP      1AH     ;default end of file for EDAS
02430 EOFM    EQU     $-1     ;changed to @@ if BASIC
02440         JP      Z,EXIT  ;or as desired by EOF param
02450         RET
02460 BACK1   LD      HL,(BPOS1)
02470         DEC     L
02480         LD      (BPOS1),HL      ;decrease buffer position
02490         LD      A,L     ;when L goes from @@ to FF
02500         INC     A       ;must get prior sector
02510         JR      NZ,BK11
02520         LD      A,(IX+10)
02530         DEC     A       ;must decrease by 2
02540         DEC     A       ;to get prior sector
02550         CALL    READ1
02560 BK11    LD      A,(HL)  ;get prior byte
02570         RET
02580 BACK2   LD      HL,(BPOS2)
02590         DEC     L
02600         LD      (BPOS2),HL
02610         LD      A,L
02620         INC     A
02630         JR      NZ,BK21
02640         LD      A,(IY+10)
02650         DEC     A
02660         DEC     A
02670         CALL    READ2
02680 BK21    LD      A,(HL)
02690         RET
02700 START   XOR     A
02710         CALL    READ1   ;read first sector
02720         LD      A,(2600H)       ;checking bit 7 of
02730         RLCA                    ;first byte
02740         CCF
02750         SBC     A,A
02760         LD      (NQ1),A ;A = @ if EDAS line numbered
02770         JR      NZ,STR1 ;else A = FF
02780         LD      A,'*'           ;'*' indicates line
02790         LD      (SCRNB+@),A     ;numbers from file
02800 STR1    XOR     A
02810         CALL    READ2
02820         LD      A,(2700H)       ;check file 2
02830         RLCA
02840         CCF
02850         SBC     A,A
02860         LD      (NQ2),A
02870         JR      NZ,BASIC
02880         LD      A,'*'
02890         LD      (SCRNB+3C@H),A
02900 BASIC   LD      BC,@
02910         LD      A,B
02920         OR      C
02930         JR      Z,EOF
02940         XOR     A               ;suppress line numering
02950         LD      (NQ1),A
02960         LD      (NQ2),A
02970         LD      (COMP+1),A
02980         LD      (EOFM),A        ;end of file is @@
02990 EOF     LD      BC,-1
03000         LD      A,C     ;if both BASIC and EOF are given
03010         INC     C       ;the value of EOF will override
03020         JR      Z,DSCRN         ;the default value of
03030         LD      (EOFM),A        ;EOFM is 1AH or 26 dec
03040         JR      DSCRN           ;provide 80 byte buffer
03050         ORG     START+50H       ;for comment line
03060 DSCRN   JR      $+2     ;provide for jump to GETKS
03070         LD      B,5             ;during auto reverse
03080         LD      HL,SCRNB
03090         SVC     @VDCTL          ;display screen buffer
03100         LD      B,3
03110         LD      HL,@C1BH        ;position blinking cursor
03120         SVC     @VDCTL          ;in middle of screen
03130         LD      BC,820H ;make sure cursor
03140         SVC     @VDCTL          ;character is 20H
03150 SWCH    JR      GETKS   ;allow jump over compare routine
03160 ;for single file commands (ADV1, ADV2, REV1, & REV2
03170 ;set SWCH+1 = @@ so that compare is done for
03180 ;NEXT, COMNT, & line prints (LN1 & LN2)
03190 COMP    LD      B,6     ;@@ if BASIC param used
03200         LD      A,B
03210         LD      DE,SCRNB+320H   ;DE => last line file 1
03220         ADD     A,E
03230         LD      E,A
03240         LD      A,B
03250         LD      HL,SCRNB+6E@H   ;HL => last line file 2
03260         ADD     A,L
03270         LD      L,A
03280         LD      A,80    ;80 characters per line
03290         SU@     B       ;don't compare EDAS line numbers
03300         LD      B,A
03310 CLP     LD      A,(DE)
03320         CP      (HL)
03330         JR      NZ,DIF
03340         INC     HL
03350         INC     DE
03360         DJNZ    CLP
03370         LD      A,20H   ;simulate <space bar>
03380 S_SWCH  JR      GETKS   ;jump to GETKS+3 if SCAN is ON
03390 DIF     LD      BC,02AH         ;change cursor to '*'
03400         SVC     @VDCTL
03410         SVC     @KEY
03420         CP      20H
03430         JR      Z,DIF
03440         PUSH    AF              ;save thia key stroke
03450         LD      BC,820H         ;change cursor to blank
03460         SVC     @VDCTL
03470         POP     AF              ;recover key stroke
03480         JR      $+5
03490 GETKS   CALL    KEY     ;need a call instead of SVC here
03500         LD      HL,TABL         ;for AUTO to work
03510         LD      B,12
03520 SRCH    CP      (HL)
03530         INC     HL
03540         LD      E,(HL)
03550         INC     HL
03560         LD      D,(HL)          ;DE => command entry
03570         INC     HL
03580         JR      Z,FOUND         ;jump if right
03590         DJNZ    SRCH
03600         JR      GETKS   ;key pressed was not a command
03610 FOUND   LD      HL,SWCH+1
03620         LD      (HL),@  ;do compare if command is firat 5
03630         LD      A,B     ;NEXT, SCAN, LN1, LN2, COMNT
03640         CP      6       ;jump over compare for last 4
03650         JR      NC,$+4  ;ADV1, ADV2, REV1, REV2
03660         LD      (HL),GETKS-SWCH-2
03670         LD      HL,DSCRN
03680         PUSH    HL      ;return address
03690         PUSH    DE      ;command address
03700         RET
03710 KEY     SVC     @KEY
03720         RET
03730 TABL    DB      20H
03740         DW      NEXT
03750         DB      'S'
03760         DW      SCAN
03770         DB      's'
03780         DW      SCAN
03790         DB      '1'
03800         DW      LN1
03810         DB      '2'
03820         DW      LN2
03830         DB      'C'
03840         DW      COMNT
03850         DB      'c'
03860         DW      COMNT
03870         DB      80H
03880         DW      EXIT
03890         DB      @BH     ;up arrow
03900         DW      ADV1
03910         DB      @AH     ;down arrow
03920         DW      ADV2
03930         DB      @8BH    ;clr up arrow
03940         DW      REV1
03950         DB      @AH     ;clr down arrow
03960         DW      REV2
03970 SCAN    LD      HL,S_SWCH+1
03980         LD      A,GETKS-S_SWCH-2        ;jump to GETKS
03990         LD      C,20H           ;to blank out "S"
04000         CP      (HL)    ;compare to current value
04010         JR      NZ,SCAN1        ;and toggle to the other
04020         LD      A,GETKS-S_SWCH+1        ;jump to GETKS+3
```

Listing continued

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```
04030 ;avoid the keyboard input at GETKS and force auto NEXT
04040         LD      C,'S'
04050 SCAN1   LD      (HL),A  ;alter jump at S_SWCH
04060         LD      HL,SCRNB+3F0H
04070         LD      (HL),C  ;put "S" or blank on screen
04080         RET
04090 NEXT    LD      B,0AFH  ;if A is non zero both files
04100 ADV1    EQU     $-1             ;will advance
04110         PUSH    AF
04120         LD      DE,SCRNB+0A0H   ;scroll eight lines
04130         LD      HL,SCRNB+0F0H
04140         LD      BC,280H
04150         LDIR    ;DE = SCRNB+320H = begin line 9
04160         CALL    GET     ;this makes LDLN loop easier
04170         EX      AF,AF'  ;save first byte
04180         LD      A,0
04190 NQ1     EQU     $-1
04200         OR      A       ;generate line numbers from
04210         CALL    NZ,LNUMB1       ;100 by 10's
04220         CALL    LDLN    ;load and display one line
04230         LD      HL,0
04240 LNCNT1  EQU     $-2     ;real line counter
04250         INC     HL
04260         LD      (LNCNT1),HL
04270         LD      DE,SCRNB+20H
04280         CALL    DECNUM
04290         POP     AF
04300         OR      A
04310         RET     Z       ;return if command was ADV1
04320 ADV2    LD      DE,SCRNB+460H
04330         LD      HL,SCRNB+4B0H
04340         LD      BC,280H
04350         LDIR    ;DE = SCRNB+6E0H = begin line 9
04360         CALL    GET
04370         EX      AF,AF'
04380         LD      A,0
04390 NQ2     EQU     $-1
04400         OR      A
04410         CALL    NZ,LNUMB2
04420         CALL    LDLN
04430         LD      HL,0
04440 LNCNT2  EQU     $-2
04450         INC     HL
04460         LD      (LNCNT2),HL
04470         LD      DE,SCRNB+3E0H
04480         CALL    DECNUM
04490         RET
04500 LDLN    EX      AF,AF'  ;recover first byte
04510         CP      0DH     ;check for empty line
04520         JR      Z,LDLN2
04530 LDLN1   CALL    DSP
04540         JR      Z,WASTE ;Z if more than 80 characters
04550         CALL    GET
04560         CP      0DH     ;end of line
04570         JR      Z,ERAS
04580         JR      LDLN1
04590 LDLN2   LD      A,88H   ;block graphic character
04600         LD      (DE),A
04610         INC     DE
04620 ERAS    LD      A,20H   ;erase to end of line
04630         CALL    DSP
04640         RET     Z
04650         JR      ERAS
04660 WASTE   CALL    GET     ;just read to next 0DH
04670         CP      0DH
04680         JR      NZ,WASTE
04690         RET
04700 LNUMB1  LD      BC,10   ;generate EDAS type line
04710         LD      HL,90   ;numbers from 100 by 10's
04720 LNMB1   EQU     $-2
04730         ADD     HL,BC
04740         LD      (LNMB1),HL
04750         JP      DECNUM
04760 LNUMB2  LD      BC,10
04770         LD      HL,90
04780 LNMB2   EQU     $-2
04790         ADD     HL,BC
04800         LD      (LNMB2),HL
04810         JP      DECNUM
04820 REV1    CALL    BACK1   ;go back one byte (0DH)
04830         LD      B,10    ;go back 10 lines
04840 RV11    CALL    BACK1
04850         CP      0DH     ;look for end of line
04860         JR      NZ,RV11
04870         LD      HL,(LNCNT1)
04880         DEC     HL      ;decrease real line numb
04890         LD      (LNCNT1),HL
04900         LD      DE,-10
04910         LD      HL,(LNMB1)      ;decrease generated
04920         ADD     HL,DE           ;line number
04930         LD      (LNMB1),HL
04940         DJNZ    RV11    ;loop for 10 lines
04950         CALL    GET1    ;get into forward gear again
04960         LD      A,0BH   ;key stroke for ADV1
04970         JR      APREP
04980 REV2    CALL    BACK2
04990         LD      B,10
05000 RV21    CALL    BACK2
05010         CP      0DH
05020         JR      NZ,RV21
05030         LD      HL,(LNCNT2)
05040         DEC     HL
05050         LD      (LNCNT2),HL
05060         LD      DE,-10
05070         LD      HL,(LNMB2)
05080         ADD     HL,DE
05090         LD      (LNMB2),HL
05100         DJNZ    RV21
05110         CALL    GET2
05120         LD      A,0AH   ;key stroke for ADV2
05130 APREP   LD      HL,AUTO
05140         LD      (HL),9  ;advance 9 lines
05150         INC     HL
05160         LD      (GETKS+1),HL    ;call AUTO instead of KEY
05170         INC     HL
05180         LD      (HL),A  ;pass proper key stroke to AUTO
05190         LD      HL,DSCRN+1      ;jump over display
05200         LD      (HL),GETKS-DSCRN-2      ;to keep screen
05210         RET     ;from flashing while 9 lines are read
05220 AUTO    DB      0       ;counter
05230         LD      A,0     ;contains key for ADV1 or ADV2
05240         LD      HL,AUTO
05250         DEC     (HL)    ;decrease count
05260         JR      Z,DUN
05270         RET
05280 DUN     LD      HL,KEY  ;replace call to KEY
05290         LD      (GETKS+1),HL
05300         XOR     A
05310         LD      HL,DSCRN+1      ;remove jump
05320         LD      (HL),A
05330         LD      A,(AUTO+2)      ;advance last of 9 lines
05340         RET
05350 CBKS    LD      B,4
05360         PUSH    HL
05370         SVC     @VDCTL  ;get current cursor posn
05380         LD      A,L     ;look at column
05390         POP     HL
05400         OR      A       ;don't backspace
05410         JR      Z,CINPT ;passed beginning of line
05420         LD      C,8
05430         SVC     @DSP
05440         DEC     HL
05450         JR      CINPT
05460 COMNT   LD      B,3
05470         LD      HL,1700H        ;move cursor to begin
05480         SVC     @VDCTL          ;of line 23
05490         LD      BC,85FH         ;and change it to
05500         SVC     @VDCTL          ;underscore
05510         LD      HL,START
05520         PUSH    HL              ;save for @PRINT
05530         LD      B,4FH   ;79 characters
05540 CINPT   SVC     @KEY
05550         CP      8
05560         JR      Z,CBKS
05570         CP      0DH
05580         JR      Z,CDUN
05590         CP      20H             ;ASCII range
05600         JR      C,CINPT
05610         CP      80H
05620         JR      NC,CINPT
05630         LD      (HL),A
05640         INC     HL
05650         LD      C,A
05660         SVC     @DSP
05670         DJNZ    CINPT
05680 CTRM    SVC     @KEY    ;80th character must be 0DH
05690         CP      0DH
05700         JR      NZ,CTRM
05710 CDUN    LD      (HL),A  ;an 0DH
05720         POP     HL      ;recover START
05730         SVC     @PRINT  ;send line to PRINTER
05740         RET
05750 LN1     LD      HL,SCRNB+320H   ;begin last line file 1
05760         JR      $+5
05770 LN2     LD      HL,SCRNB+6E0H   ;begin last line file 2
05780         PUSH    HL      ;save for second @PRINT
05790         LD      DE,50H
05800         ADD     HL,DE   ;get end of line
05810 LSRCH   DEC     HL
05820         LD      A,(HL)
05830         CP      20H     ;ignore all trailing spaces
05840         JR      Z,LSRCH
05850         INC     HL
05860         LD      (HL),0DH        ;mark end line with 0DH
05870         EX      (SP),HL         ;save the spot to stack
05880         PUSH    HL              ;replace begin spot
05890         LD      A,H
05900         CP      2FH
05910         LD      HL,TWO
05920         JR      NZ,$+5  ;NZ means it was 32H and want TWO
05930         LD      HL,ONE
05940         SVC     @PRINT  ;print file ID message
05950         POP     HL      ;recover beginning of line
05960         SVC     @PRINT  ;print line
05970         POP     HL      ;recover end spot and
05980         LD      (HL),20H        ;remove the 0DH
05990         RET             ;before screen display
06000 ONE     DB      'File 1  ',3
06010 TWO     DB      'File 2  ',3
06020 BOT     EQU     $
06030         ORG     2C00H
06040 SCRNB   DB      20H
06050 MSGFS1  EQU     SCRNB+2         ;where to put filespecs
06060 MSGFS2  EQU     SCRNB+3C2H      ;on screen display
06070         END     ENTRY
```

End

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By moving to CP/M on your Model 4 you achieve two things. First you open the door to a wealth of existing software. More 8-bit software runs under CP/M than any other opereting system. This includes virtually all of the "big name" programs which have set the standards by which all others are measured. Programs like WordStar, dBASE II, and Turbo Pascal ere available for CP/M, but not TRSDOS. Public domain software, almost unknown under TRSDOS, fills hundreds of megabytes of disk space. Valuable public domain programs like the Small C Compiler are just a toll-free phone call away. Most importantly, hundreds of applications programs are available from a multitude of vendors. Many include the source code. Wouldn't you like to be able to choose from scores of Accounts Receivable or General Ledger programs, instead of the meager selection you now have? Circle our special Reader Service number 600 on the Reader Service Card to receive our comprehensive free listing of suppliers of application programs that run under CP/M.

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Is it easy to use?

Montezuma Micro's CP/M has been carefully crafted to present a maximum of features while taking a minimum of memory. It supports all of the standard features of the Model 4/4P/4D computers, as well as most of the optional ones. Our CP/M has been consistently been awarded the highest ratings in industry magazines. It is version 2.2, the most popular and reliable of all the versions of CP/M produced. Our CP/M has been made as easy to use as possible. All customer-selected features are chosen from simple menus in our CONFIG utility. This includes the ability to configure a disk drive to run like that of scores of other CP/M computers for maximum ease of software portability. Using the unique DBLCROSS program in our Monte's Toolkit utility package you can move files back and forth between CP/M, TRSDOS (1.3 and 6.x), and MS-DOS.

Why use Montezuma CP/M?

We heve already told you why our CP/M is the best for the Radio Shack Model 4 computer. The only question left to answer is "Why buy CP/M at all?" Radio Shack has abandoned TRSDOS — all of their new machines use MS-DOS. Most of the software producers have followed, leaving no new softwere development and saddling the TRSDOS user with whatever software "leftovers" he can find. Which DOS do you want to heed into the future with: the one originally written for the Model I or the one that served as the basis for MS-DOS? Make the right choice right now for just $169.

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CP/M hard disk drivers are available for Radio Shack, Aerocomp, and most other popular brands of hard disk drives. These drivers allow the hard drive to be partitioned into one to four logical drives of varying sizes. These drives may all be used by CP/M, or may be divided between CP/M and TRSDOS. A head-parking utility is included on the driver disk to minimize the risk of damage when the hard disk drive is not in use. Also included at no charge is e utility which will copy, compress, list, print, and delete files with ease. There isn't much you can say about a driver. It either works or it doesn't. Ours works supremely and it only costs $30.

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Data-Statement Generator

Convert assembly code to Basic Data statements with checksums.

Converting assembly-language source code to Basic Data statements has its advantages. For instance, you can use converted assembly routines within Basic programs, or you can share your assembly code with programmers who don't own an editor/assembler.

My program, Datapoke, reads a CMD file and writes a Basic program. This Basic program contains the CMD file code in Data statements (in decimal format). It also contains the code to read the Data statements, verify each line with checksums and write a CMD file, using the same file name as the original CMD file.

How It Works

Datapoke differs from similar utilities in that it does not go past the actual end of file within the last record of the source file, and it builds a checksum value for each line of data. When the new program runs, it processes each Data Statement and checks its sum against the final value at the end of the line (the value with the minus-sign (-) flag preceding it). If the numbers match, the program processes the next line. If they do not match, it reports a checksum error in the current line and displays the line number.

Should someone type in the new program and enter an incorrect data or checksum value, the program indicates an error when run.

Using Datapoke

Type Datapoke in Basic on your Model I/III/4 (Program Listing 1) or Tandy 1000 (Program Listing 2) and save it. Datapoke uses the "Source" prompt to ask for the file name of the CMD program you want to convert, and the "Destination" prompt for the name of the Basic program that you want to create.

Datapoke opens the files, displays the

System Requirements

Model I/III/4 or Tandy 1000
16K RAM
Disk Basic or GW-Basic
One disk drive
Available on The Disk Series

Program Listing 1. Datapoke for Models I/III/4. See p. 116 for information on using the checksums in Listings 1 and 2.

```
10 CLS:PRINT"DATAPOKE WITH CHECKSUM -- BY DAVID GOBEN":PRINT                '* 3989
20 PRINT:PRINT"THIS PROGRAM CONVERTS A MACHINE LANGUAGE (CMD) PR
   OGRAM;"                                                                 '* 4784
30 PRINT"THE SOURCE FILE, TO A BASIC LANGUAGE FORMAT FILE; THE"            '* 4097
40 PRINT"DESTINATION FILE":PRINT:ON ERROR GOTO 0                           '* 3272
50 CLEAR:DEFINT A-Z:Q$=CHR$(34)                                           '* 1981
60 SF$="":LINE INPUT"SOURCE MACHINE LANGUAGE FILE: ";SF$:OPEN"I"
   ,1,SF$:CLOSE                                                            '* 4837
70 DF$="":LINE INPUT"DESTINATION BASIC LANGUAGE FILE: ";DF$                '* 3767
80 IF DF$=SF$ THEN 130                                                     '* 1258
90 T1$=SF$:X=INSTR(SF$,":"):IF X THEN T1$=LEFT$(SF$,X-1)                  '* 3352
100 T2$=DF$:X=INSTR(DF$,":"):IF X THEN T2$=LEFT$(DF$,X-1)                 '* 3349
110 IF T1$=T2$ THEN IF T1$=SF$ OR T2$=DF$ THEN 130                         '* 2859
120 OPEN"O",2,DF$:GOTO 140                                                 '* 1496
130 PRINT"MATCHING FILESPECS!!!":FOR X=1 TO 3000:NEXT:PRINT:GOTO
    60                                                                     '* 4311
140 OPEN"R",1,SF$:FIELD 1,1 AS A$:P1=PEEK(VARPTR(A$)+1)+256*PEEK
   (VARPTR(A$)+2)                                                          '* 4593
150 IF P1>32767 THEN P=P1-65536! ELSE P=P1                                 '* 2376
160 PRINT#2,"10 'DATA POKE FORMAT CREATED ON DATAPOKE/BAS""                '* 3688
170 PRINT#2,"20 CLS:PRINT"Q$"BUILDING '"T1$"'"Q$":RESTORE"                 '* 2338
180 PRINT#2,"30 OPEN"Q$"O"Q$",1,"Q$;T1$;Q$":L=98"                         '* 2691
190 PRINT#2,"40 CS=0:L=L+10"                                               '* 1582
200 PRINT#2,"50 READ A$:IF A$="Q$"END"Q$"THEN CLOSE:END"                   '* 3284
210 PRINT#2,"60 IF LEFT$(A$,1)="Q$"-"Q$"THEN IF VAL(MID$(A$,2))=
   CS THEN 40 ELSE PRINT"Q$"CHECKSUM ERROR IN LINE"Q$"L:END"               '* 7203
220 PRINT#2,"70 A=VAL(A$):PRINT#1,CHR$(A);:CS=CS+A"                        '* 3816
230 PRINT#2,"80 GOTO 50":PRINT#2,"90 ''' DATA AREA '''"                    '* 3839
240 PRINT#2,"100 DATA ";:Q$="":DC=0:X=0:Y=1:GET 1,1:CS=0:L=110             '* 3558
250 PRINT:PRINT"NUMBER OF RECORDS:"LOF(1)":    WORKING ON...."             '* 3888
260 PRINT"RECORD 1,";                                                      '* 1280
270 GOSUB 310:IF A=2 THEN 290                                              '* 1688
280 GOSUB 310:Z=A:FOR Z1=1 TO Z:GOSUB 310:NEXT Z1:GOTO 270                 '* 3637
290 FOR Z=1 TO 3:GOSUB 310:NEXT Z:IF CF=0 THEN GOSUB 340                   '* 3462
300 PRINT#2,"END":CLOSE:PRINT:PRINT"...DONE":END                           '* 3103
310 A=PEEK(P+X):X=X+1:IF X>255 THEN X=0:Y=Y+1:GET 1,Y:PRINT,"REC
   ORD"STR$(Y)",";                                                         '* 4986
320 PRINT#2,Q$;MID$(STR$(A),2);:Q$=",":CF=0:CS=CS+A                        '* 2981
330 DC=DC+1:IF DC<15 THEN RETURN                                           '* 1982
340 PRINT#2,",-"MID$(STR$(CS),2):CS=0:DC=0:CF=1                            '* 2735
350 PRINT#2,CHR$(13);:Q$="":PRINT#2,MID$(STR$(L),2)" DATA ";:L=L
   +10:RETURN                                                              '* 4388
```

End

Program Listing 2. Datapoke for the Tandy 1000.

```
10 CLS:PRINT"DATAPOKE WITH CHECKSUM -- BY DAVID GOBEN":PRINT               '* 3989
20 PRINT:PRINT"THIS PROGRAM CONVERTS A MACHINE LANGUAGE (COM) PROG
   RAM;"                                                                   '* 4795
30 PRINT"THE SOURCE FILE, TO A BASIC LANGUAGE FORMAT FILE; THE"            '* 4097
40 PRINT"DESTINATION FILE":PRINT:ON ERROR GOTO 0                           '* 3272
50 CLEAR:DEFINT A-Z:Q$=CHR$(34)                                           '* 1981
60 SF$="":LINE INPUT"SOURCE MACHINE LANGUAGE FILE: ";SF$:OPEN"I",1
   ,SF$:CLOSE                                                              '* 4837
70 DF$="":LINE INPUT"DESTINATION BASIC LANGUAGE FILE: ";DF$                '* 3767
80 IF DF$=SF$ THEN 130                                                     '* 1258
90 T1$=SF$:X=INSTR(SF$,":"):IF X THEN T1$=MID$(SF$,X+1)                   '* 3269
100 T2$=DF$:X=INSTR(DF$,":"):IF X THEN T2$=MID$(DF$,X+1)                  '* 3266
110 IF T1$=T2$ THEN IF T1$=SF$ OR T2$=DF$ THEN 130                         '* 2859
120 OPEN"O",2,DF$:GOTO 140                                                 '* 1496
130 PRINT"MATCHING FILESPECS!!!":FOR X=1 TO 3000:NEXT:PRINT:GOTO 6
   0                                                                       '* 4311
140 OPEN"R",1,SF$,1:FIELD 1,1 AS A$:RL=LOF(1)/512:IF LOF(1)>RL*512
    THEN RL=RL+1                                                           '* 4626
160 PRINT#2,"10 'DATA POKE FORMAT CREATED ON DATAPOKE/BAS""                '* 840
170 PRINT#2,"20 CLS:PRINT"Q$"BUILDING '"T1$"'"Q$":RESTORE"                 '* 2338
180 PRINT#2,"30 OPEN"Q$"O"Q$",1,"Q$;T1$;Q$":L=98"                         '* 2691
190 PRINT#2,"40 CS=0:L=L+10"                                               '* 1582
200 PRINT#2,"50 READ A$:IF A$="Q$"END"Q$"THEN CLOSE:END"                   '* 3284
210 PRINT#2,"60 IF LEFT$(A$,1)="Q$"-"Q$"THEN IF VAL(MID$(A$,2))=CS
    THEN 40 ELSE PRINT"Q$"CHECKSUM ERROR IN LINE"Q$"L:END"                 '* 7203
220 PRINT#2,"70 A=VAL(A$):PRINT#1,CHR$(A);:CS=CS+A"                        '* 3816
230 PRINT#2,"80 GOTO 50":PRINT#2,"90 ''' DATA AREA '''"                    '* 2838
240 PRINT#2,"100 DATA ";:Q$="":DC=0:X=0:Y=1:CS=0:L=110                     '* 3102
250 PRINT:PRINT"NUMBER OF RECORDS:"RL":    WORKING ON...."                 '* 3691
260 PRINT"RECORD 1,";                                                      '* 1280
270 GOSUB 310:IF LOC(1)<LOF(1) THEN 270                                    '* 2269
300 GOSUB 340:PRINT#2,"END":CLOSE:PRINT:PRINT"...DONE":END                 '* 3728
310 GET 1:X=X+1:IF X>512 THEN X=0:Y=Y+1:PRINT,"RECORD"STR$(Y)",";          '* 4000
320 PRINT#2,Q$;MID$(STR$(ASC(A$)),2);:Q$=",":CF=0:CS=CS+ASC(A$)           '* 3645
330 DC=DC+1:IF DC<15 THEN RETURN                                           '* 1982
340 PRINT#2,",-"MID$(STR$(CS),2):CS=0:DC=0:CF=1                            '* 2735
350 PRINT#2,CHR$(13);:Q$="":PRINT#2,MID$(STR$(L),2)" DATA ";:L=L+1
   0:RETURN                                                                '* 4388
```

End

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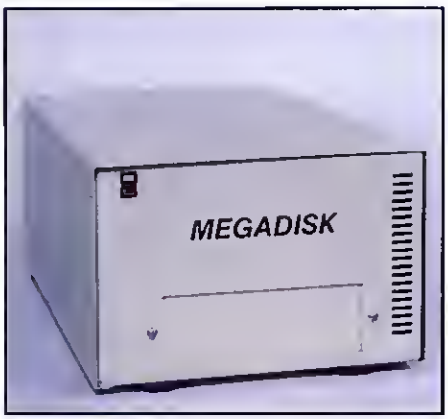

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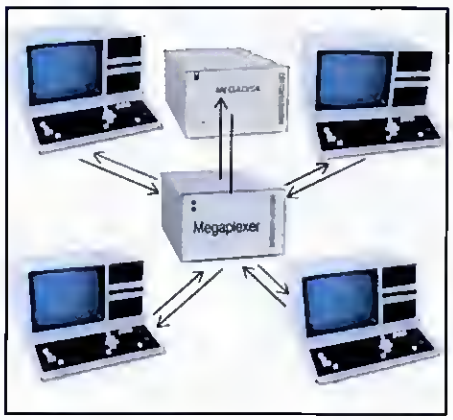

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number of records that it will process, and reports as it works on each record. It saves the new Basic program in ASCII format.

Hex It

If you prefer to have the Data Statements in hexadecimal (hex) format (Models 4 or 1000), you can make the following changes. In line 220, change A = VAL(A$) to A = VAL ("Q$" &H"Q$" + A$). In line 320, replace MID$(STR$(A),2) with B$.

For the Model 4, insert line 315 B$ = HEX$ (A): IF LEN(B$) = 1 THEN B$ = "0" + B$. For the Tandy 1000, insert line 315 as above but replace (A) with (ASC(A)).

With the above changes, the data will be printed in hex, but the checksum at the end of the line will still be decimal.

The Rub

Datapoke can turn a 10-page assembly listing into two pages of Data statements (an 80-percent reduction). The disadvantage is that data listings do not show how a program operates as clearly as an assembly-code listing.■

David Goben is a programming consultant. Write to him at 67 Highland Road, Mansfield Center, CT 06250.

TIDBIT #42

Some decimal-to-fraction conversion routines are not applicable to the real world. They produce fractions that most people have no use for, such as 3/200. My routine, Jimsfrac, converts decimals to fractions that are used in the trades: 64ths, 32nds, 16ths, eighths, fourths, and halves.

In most cases, a decimal doesn't convert exactly to a fraction, so lines 220 and 240 round off a decimal to the next 64th. This produces a result that is accurate enough for most industrial and trade purposes.

To convert to fractions in 32nds, you must change .015625 to .03125 and .984375 to .96875 in line 220. Change .015625 to .03125 in line 240. Finally, you must change 1000000 to 100000, 15625 to 3125, and 64 to 32 in line 280.

To convert to fractions in 16ths, you must change .015625 to .0625 and .984375 to .9375 in line 220. Also, you must change .015625 to .0625 in line 240. Finally, you must change 1000000 to 10000, 15625 to 625, and 64 to 16 in line 280.

Jim C. Cahlik
Parma, OH

Program Listing. Jimsfrac

```
10  '  JIMSFRAC    BY JIM C. CAHLIK   01/21/87
20 CLS                                                          '*  356
40 GOSUB 50:PRINT W$:GOTO 30                                    '* 1761
30 LINE INPUT"ENTER DECIMAL (XXX.XXXXXX) ";U$                   '* 2999
50 A=VAL(U$):B=INT(A):D=A-B:C=(INT(D/.015625))*.015625          '* 3063
60 IF D>.984375 THEN B=B+1:C=0:GOTO 80                          '* 2282
70 IF B+C<A THEN C=C+.015625:GOTO 70                            '* 2075
80 U$=STR$(B)+STR$(C):V=INSTR(U$,".")                           '* 2191
90 IF V=0 THEN W$=STR$(B):RETURN                                '* 2028
100 C=INT(C*1000000):NU=C/15625:DE=64                           '* 2004
110 IF NU>2 AND DE/2=INT(DE/2) AND NU/2=INT(NU/2) THEN DE=DE/2:N
    U=INT(NU/2):IF NU>2 THEN 110                                '* 5598
120 IF NU=2 THEN DE=DE/2:NU=NU/2                                '* 1969
130 W$=STR$(B)+" "+STR$(NU)+"/"+STR$(DE)                        '* 2215
140 RETURN                                                      '*  661
```

End

Circle 202 on Reader Service card.

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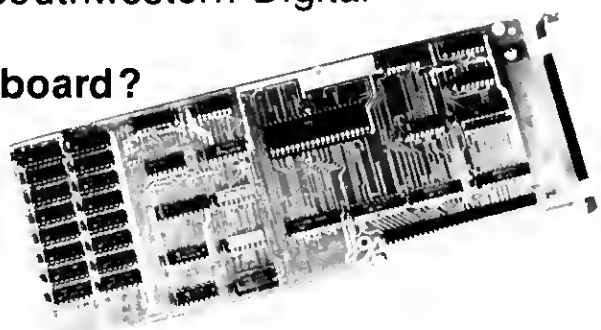

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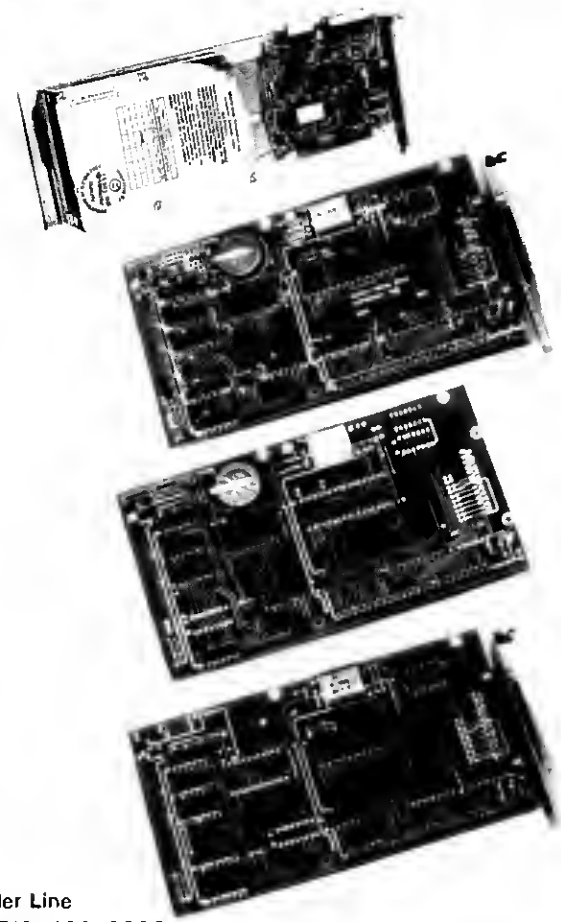

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Strip Your TRSDOS

Purge unprotected files from your system disks in one step.

Remove4 is an assembly-language, automatic-purge utility for the Model 4 that removes all visible, unprotected files from a disk in a specified drive. I wrote Remove4 to solve a simple, yet nagging problem.

The Model 4 TRSDOS disk has little room for user files. You must either write your files to a data disk in drive 1 or strip the TRSDOS disk of unnecessary utilities and SYS files with the Remove or Purge commands.

If you write your files to drive zero, you'll end up with many different TRSDOS configurations. You *should* immediately make and label a copy of each new configuration, but I often start using the disk for my application before making a backup. (Sound familiar?) Even with the extra space, the disk eventually becomes filled.

Before I wrote Remove4, I had to either back up the original TRSDOS master and configure it the same as my work disk, or back up my work disk and then remove or purge the user files to get a fresh disk. Either way, it was extra work.

Remove4

Once you assemble and execute the utility (see the Program Listing), a screen prompt asks you to type the drive number (zero–7) containing the disk with the unwanted files. Typing Q at this prompt returns you to TRSDOS.

The program checks to see if the chosen drive is in the drive-code table. If it isn't, you'll see a message telling you so, and Remove4 returns you to the drive-number prompt.

If the program recognizes the drive, it then checks to see if the specified drive is ready. If not, you'll get another message, and Remove4 returns to the drive-number prompt.

If the drive is ready, the utility displays the directory of the chosen drive and asks you to verify that you really want to remove all the files. Remove4 lists all visible files, but it will not delete visible protected files. Responding with N or Q returns you to the drive-number prompt.

Typing Y automatically removes the unprotected files one by one. The bottom line of the screen (line 23) displays the file name currently being removed. Don't be alarmed if Remove4 seems to be removing a protected file; once the purge is complete, a directory of the drive will show that all protected files remain.

The program tells you when it has removed all the visible, unprotected files. Pressing any key at this point returns the utility to the drive-number prompt. Here you can either repeat the process on another disk by inserting the disk and typing the appropriate drive number, or type Q to return to DOS.

Remove4 removes files on 5¼- or 8-inch, single- or double-sided DOS and data disks alike. It can handle up to 254 files on any one disk.(This is the maximum number of files that TRSDOS allows.) Remove4 should work on a hard disk, as long as the number of files on the specified drive does not exceed 254.

To execute, the system disk must have the following TRSDOS files: SYS0/SYS, SYS1/SYS, SYS2/SYS, SYS3/SYS, SYS10/SYS, and SYS12/SYS. This information can be on a disk in drive zero or residing in memory.

Final Notes

I used the Model III EDTASM program patched to work on a Model 4 to create Remove4. You can type it in using any of the currently available Model 4 editor/assemblers.

I've liberally commented the source code, so anyone with some knowledge of assembly or who has the Model 4 technical reference manual should find it easy to follow the flow of the code. I welcome any comments regarding this utility. ■

Write to Lance Wolstrup at 20311 Sherman Way #221, Canoga Park, CA 91306.

System Requirements

Model 4
TRSDOS 6.x
Editor/assembler
Available on The Disk Series

Program Listing. Remove4.

```
00100 ;*****************************************************
00110 ;*           REMOV4/SRC   by Lance Wolstrup          *
00120 ;*   20311 Sherman Way #221,Canoga Park, CA  91306    *
00130 ;*                                                   *
00140 ;* A utility for TRSDOS 6.x.x. that removes all visible *
00150 ;* user files from specified diskette                *
00160 ;*****************************************************
00170          ORG     2600H           ;ASSEMBLE AT 2600H
00180 START    CALL    CLS             ;ERASE SCREEN
00190          CALL    NOCURS          ;TURN OFF CURSOR
00200          CALL    SCREEN          ;DISPLAY LINES 0-4 ON SCREEN
00210          CALL    PROT            ;SCROLL PROTECT TOP 5 LINES
00220          JP      BEGIN           ;JUMP OVER SUBROUTINES
00230 ;           ***** SUBROUTINES ****
00240 ; ** EXIT TO DOS **
00250 QUIT     CALL    UNPROT          ;REMOVE SCROLL PROTECT
00260          CALL    CLS             ;ERASE SCREEN
00270          LD      HL,0            ;HL=0 MEANS NORMAL RETURN TO DOS
00280          LD      A,22
00290          RST     28H             ;@EXIT
00300 ; ** ERASE SCREEN **
00310 CLS      LD      A,1CH           ;PRINT CHR$(28) - HOME CURSOR
00320          CALL    DSP
00330          LD      A,1FH           ;PRINT CHR$(31) - ERASE TO END OF DISPLAY
00340          CALL    DSP
00350          RET
00360 ; ** POSITION CURSOR **
00370 ; NOTE VERTICAL (H) AND HORIZONTAL (L) HAS BEEN LOADED BY CALLER
00380 LOCATE   LD      A,15
00390          LD      B,3             ;MOVE CURSOR TO HL - EVEN IF INVISIBLE
00400          RST     28H             ;@VDCTL
00410          RET
00420 ; ** SCROLL PROTECT TOP 5 LINES **
00430 PROT     LD      A,15
00440          LD      B,7             ;SCROLL PROTECT FUNCTION
00450          LD      C,5             ;PROTECT 4 LINES
00460          RST     28H             ;@VDCTL
00470          RET
00480 ; ** REMOVE SCROLL PROTECT **
00490 UNPROT   LD      A,15
```

Listing continued

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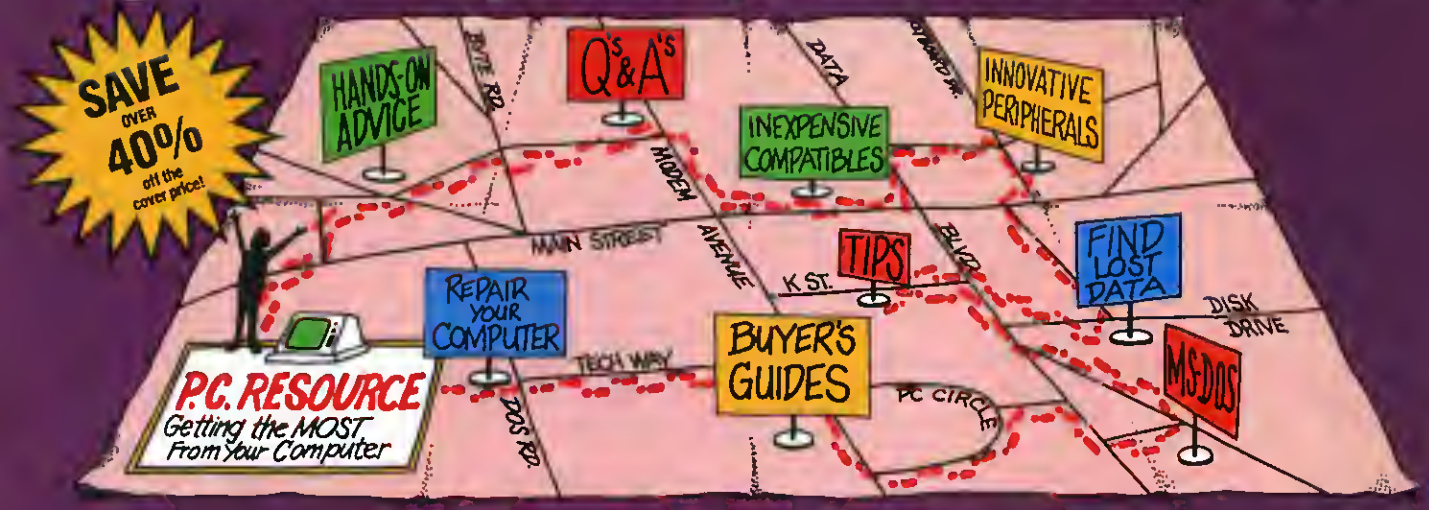

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```
00500           LD      B,7             ;SCROLL PROTECT FUNCTION
00510           LD      C,0             ;PROTECT 0 LINES
00520           RST     28H             ;@VDCTL
00530           RET
00540 ; ** DISPLAY MESSAGES **
00550 CHROUT    LD      A,(HL)          ;PUT CHARACTER FROM HL INTO A
00560           OR      A               ;IS IT TERMINATING BYTE - 0
00570           RET     Z               ;IF 0 - TERMINATE MESSAGE
00580           LD      C,A             ;PUT CHARACTER INTO C
00590           LD      A,2
00600           RST     28H             ;@DSP
00610           INC     NL              ;POINT TO NEXT CHARACTER IN MESSAGE
00620           JR      CHROUT          ;GO BACK AND DO IT AGAIN
00630 ; ** WAIT FOR KEYPRESS **
00640 INKEY     LD      A,1
00650           RST     28H             ;@KEY
00660           RET
00670 ; ** DISPLAY CHARACTER **
00680 DSP       LD      C,A             ;PUT CHARACTER INTO C
00690           LD      A,2
00700           RST     28H             ;@DSP
00710           LD      A,C             ;PUT CHARACTER BACK INTO A
00720           RET
00730 ; ** TURN OFF CURSOR **
00740 NOCURS    LD      A,15            ;PRINT CHR$(15) - CURSOR OFF
00750           CALL    DSP
00760           RET
00770 ; ** TURN ON CURSOR **
00780 CURSOR    LD      A,14            ;PRINT CHR$(14) - CURSOR OFF
00790           CALL    DSP
00800           RET
00810 ; ** DISPLAY "PRESS ANY KEY TO CONTINUE" AND WAIT FOR KEYPRESS **
00820 ANYSUB    LD      H,23            ;POSITION CURSOR AT LINE 23
00830           LD      L,27            ;COLUMN 27
00840           CALL    LOCATE
00850           LD      HL,ANYKEY       ;DISPLAY ANYKEY MESSAGE
00860           CALL    CHROUT
00870           CALL    CURSOR          ;TURN ON CURSOR
00880           CALL    INKEY           ;WAIT FOR KEYPRESS
00890           CALL    NOCURS          ;TURN OFF CURSOR
00900           LD      H,5             ;POSITION CURSOUR AT LINE 5
00910           LD      L,29            ;COLUMN 29
00920           CALL    LOCATE
00930           LD      A,1FH           ;PRINT CHR$(31) - ERASE TO END OF DISPLAY
00940           CALL    DSP
00950           RET
00960 ; ** SELECTED DRIVE IS NOT CONFIGURED IN DRIVE CODE TABLE **
00970 NODRV     LD      H,20            ;POSITION CURSOR AT LINE 20
00980           LD      L,25            ;COLUMN 25
00990           CALL    LOCATE
01000           LD      HL,NDMSG1       ;DISPLAY NDMSG1
01010           CALL    CHROUT
01020           CALL    ANYSUB          ;DISPLAY ANYKEY MESSAGE
01030           JP      INKEY1          ;GO BACK AND ASK FOR DRIVE NUMBER
01040 ; ** SELECTED DRIVE EITHER CONTAINS NO DISK OR CANNOT READ DISK **
01050 NODSK     LD      H,20            ;POSITION CURSOR AT LINE 20
01060           LD      L,27            ;COLUMN 27
01070           CALL    LOCATE
01080           LD      HL,NDMSG2       ;DISPLAY NDMSG2
01090           CALL    CHROUT
01100           CALL    ANYSUB          ;DISPLAY ANYKEY MESSAGE
01110           JP      INKEY1          ;GO BACK AND ASK FOR DRIVE NUMBER
01120 ; ** DISPLAY COPYRIGHT, PROGRAM NAME AND DESCRIPTION ON THE **
01130 ; ** TOP 3 LINES (0-2) - THEN DRAW VERTICAL LINE ON 4th LINE (3) **
01140 SCREEN    LD      H,0             ;POSITION CURSOR AT LINE 0
01150           LD      L,25            ;COLUMN 25
01160           CALL    LOCATE
01170           LD      HL,MSG1         ;DISPLAY COPYRIGHT MESSAGE
01180           CALL    CHROUT
01190           LD      H,1             ;POSITION CURSOR AT LINE 1
01200           LD      L,29            ;COLUMN 29
01210           CALL    LOCATE
01220           LD      HL,MSG2         ;DISPLAY NAME OF PROGRAM
01230           CALL    CHROUT
01240           LD      H,2             ;POSITION CURSOR AT LINE 2
01250           LD      L,9             ;COLUMN 9
01260           CALL    LOCATE
01270           LD      HL,MSG3         ;DISPLAY DESCRIPTION OF PROGRAM
01280           CALL    CHROUT
01290           LD      H,3             ;POSITION CURSOR AT LINE 3
01300           LD      L,0             ;COLUMN 0
01310           CALL    LOCATE
01320           LD      B,80
01330 PRT131    LD      A,131           ;DRAW HORIZONTAL LINE - STRING$(80,131)
01340           CALL    DSP
01350           DJNZ    PRT131
01360           RET
01370 ;**** PROGRAM BEGINS NERE ****
01380 BEGIN     LD      NL,DIRBUF       ;POINT HL TO BUFFER CONTAINING DIR
01390           LD      B,22
01400           LD      A,20H           .
01410 CLEAR     LD      (HL),A          ;PUT SPACES IN 1st 22 BYTES OF DIRBUF
01420           INC     HL
01430           DJNZ    CLEAR
01440           LD      H,5             ;POSITION CURSOR ON LINE 5
01450           LD      L,0             ;COLUMN 0
01460           PUSH    HL              ;SAVE CURSOR LOCATION
01470           CALL    LOCATE
01480           LD      A,1FH           ;PRINT CHR$(31) - ERASE TO END OF DISPLAY
01490           CALL    DSP
01500           POP     HL              ;RESTORE CURSOR LOCATION
01510           CALL    LOCATE
01520           LD      HL,WCHDRV       ;PRINT MESSAGE ON SCREEN
01530           CALL    CHROUT
01540 INKEY1    CALL    CURSOR          ;TURN ON CURSOR
01550           CALL    INKEY           ;WAIT FOR KEYPRESS
01560           CP      51H
01570           JP      Z,QUIT          ;IF Q IS PRESSED - BACK TO DOS
01580           CP      71H
01590           JP      Z,QUIT          ;IF q IS PRESSED - BACK TO DOS
01600           CP      30H
01610           JR      C,INKEY1        ;JUMP IF SMALLER THAN 0
01620           CP      38H
01630           JR      NC,INKEY1       ;JUMP IF EQUAL OR LARGER THAN 8
01640           PUSH    AF              ;SAVE DRIVE NUMBER IN A
01650           CALL    NOCURS          ;TURN OFF CURSOR
01660           POP     AF              ;RESTORE DRIVE NUMBER
01670           CALL    DSP             ;DISPLAY IT
01680           SUB     30H             ;GET TRUE DRIVE NUMBER
01690           LD      (SRCBUF),A      ;STORE IT IN SRCBUF
01700           LD      C,A
01710           LD      A,40
01720           RST     28H             ;@DCSTAT - IS DRIVE DEFINED IN DCT
01730           JP      NZ,NODRV        ;ERROR - SO JUMP TO NODRV
01740           LD      A,(SRCBUF)      ;PUT DRIVE NUMBER INTO A
01750           LD      C,A             ;PUT IT INTO C
01760           LD      A,33
01770           RST     28H             ;@CHKDRV - IS A FORMATTED DISKETTE
01780                                   ;IN SELECTED DRIVE
01790           JP      NZ,NODSK        ;ERROR - JUMP TO NODSK
01800           LD      A,(SRCBUF)      ;PUT DRIVE NUMBER INTO A
01810           LD      B,A             ;PUT IT INTO B
01820           LD      C,0             ;GET DIRECTORY AF ALL VISIBLE FILES
01830           LD      HL,DIRBUF       ;POINT TO BUFFER
01840           LD      A,35
01850           RST     28H             ;@RAMDIR - GET DIRECTORY RECORDS
01860           LD      HL,DIRBUF       ;POINT HL TO 1st CHR IN DIRBUF
01870           LD      A,(HL)          ;PUT CHR INTO A
01880           CP      20H             ;IS IT A SPACE
01890           JP      Z,EMPTY         ;NO RECORDS - JUMP TO EMPTY
01900           LD      H,5             ;POSITION CURSOR AT LINE 5
01910           LD      L,0             ;COLUMN 0
01920           PUSH    HL              ;SAVE CURSOR LOCATION
01930           CALL    LOCATE
01940           LD      A,1FH           ;PRINT CHR$(31) - ERASE TO END OF DISPLAY
01950           CALL    DSP
```

Listing continued

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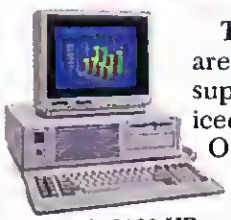

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Listing continued

```
01960           POP     HL              ;RESTORE CURSOR LOCATION
01970           CALL    LOCATE
01980           LD      A,(SRCBUF)      ;GET DRIVE NUMBER
01990           LD      C,A             ;PUT IT IN C
02000           LD      B,0             ;SELECT VISIBLE NON-SYSTEM FILES
02010           LD      A,34
02020           RST     28H             ;@OODIR - DISPLAY DIRECTORY
02030           LD      H,23            ;POSITION CURSOR AT LINE 23
02040           LD      L,27            ;COLUMN 27
02050           CALL    LOCATE
02060           LD      HL,REMMSG       ;DISPLAY REMMSG
02070           CALL    CHROUT
02080           CALL    CURSOR          ;TURN ON CURSOR
02090 INKEY2    CALL    INKEY           ;WAIT FOR KEYPRESS
02100           CP      51H
02110           JP      Z,BEGIN         ;IF Q - JUMP TO BEGIN
02120           CP      71H
02130           JP      Z,BEGIN         ;IF q - JUMP TO BEGIN
02140           CP      4EH
02150           JP      Z,BEGIN         ;IF N - JUMP TO BEGIN
02160           CP      6EH
02170           JP      Z,BEGIN         ;IF n - JUMP TO BEGIN
02180           CP      59H
02190           JR      Z,CNTNUE        ;IF Y - JUMP TO CNTNUE
02200           CP      79H
02210           JR      Z,CNTNUE        ;IF y - JUMP TO CNTNUE
02220           JR      INKEY2          ;JUMP BACK TO INKEY2
02230 CNTNUE    CALL    NOCURS          ;TURN OFF CURSOR
02240           LD      H,23            ;POSITION CURSOR AT LINE 23
02250           LD      L,0             ;COLUMN 0
02260           PUSH    HL              ;SAVE CURSOR POSITION
02270           CALL    LOCATE
02280           LD      A,1EH           ;PRINT CHR$(30) - ERASE TO END OF LINE
02290           CALL    DSP
02300           POP     HL              ;RESTORE CURSOR POSITION
02310           CALL    LOCATE
02320           LD      HL,REMFIL       ;DISPLAY REMFIL MESSAGE
02330           CALL    CHROUT
02340           LD      HL,DIRBUF       ;POINT HL TO DIRBUF
02350 LOOP00    LD      (BUFLOC),HL     ;PUT ADDRESS OF DIRBUF INTO BUFLOC
02360           LD      B,14            ;LENGTH OF FILENAME/EXT:D
02370 LOOP01    LD      A,(HL)          ;GET CHARACTER INTO A
02380           CP      2BH             ;IS IT +    (+ MARKS BUFFER END)
02390           JR      Z,EOF           ;IF CHARACTER IS +   JUMP TO EOF
02400           CALL    DSP             ;DISPLAY IT
02410           INC     HL              ;NEXT CHARACTER
02420           DJNZ    LOOP01          ;REPEAT UNTIL A CONTAINS +
02430           LD      IX,BUFLOC       ;POINT IX TO BUFLOC
02440           LD      L,(IX+0)        ;GET LSB OF CURRENT BUFFER LOCATION
02450           LD      H,(IX+1)        ;GET MSB OF CURRENT BUFFER LOCATION
02460           LD      DE,FCB          ;POINT DE TO FILE CONTROL BLOCK
02470           LD      A,78
02480           RST     28H             ;@FSPEC - MOVES FILE FROM BUFFER TO FCB
02490           LD      DE,17
02500           ADD     HL,DE           ;POINT HL TO LRL BYTE
02510           LD      B,(HL)          ;PUT IT INTO B
02520           LD      HL,IOBUF        ;POINT HL TO IO BUFFER
02530           LD      DE,FCB          ;POINT DE TO FILE CONTROL BUFFER
02540           LD      A,59
02550           RST     28H             ;@OPEN - OPENS FILE IN FCB
02560           LD      A,57
02570           LD      DE,FCB          ;POINT DE TO FILE CONTOL BLOCK
02580           RST     28H             ;@REMOVE - REMOVES FILE
02590           LD      L,(IX+0)        ;GET LSB OF CURRENT BUFFER LOCATION
02600           LD      H,(IX+1)        ;GET MSB OF CURRENT BUFFER LOCATION
02610           LD      DE,22
02620           ADD     HL,DE           ;POINT HL TO NEXT FILESPEC
02630           PUSH    HL              ;SAVE BUFFER LOCATION
02640           LD      H,23            ;POSITION CURSOR AT LINE 23
02650           LD      L,14            ;COLUMN 14
02660           PUSH    HL              ;SAVE CURSOR LOCATION
02670           CALL    LOCATE
02680           LD      A,1EH           ;PRINT CHR$(30) - ERASE TO END OF LINE
02690           CALL    DSP
02700           POP     HL              ;RESTORE CURSOR POSITION
02710           CALL    LOCATE
02720           POP     HL              ;RESTORE BUFFER LOCATION
02730           JR      LOOP00          ;GO BACK AND GET NEXT FILE
02740 ; ** END OF BUFFER **
02750 EOF       LD      H,22            ;POSITION CURSOR AT LINE 22
02760           LD      L,0             ;COLUMN 0
02770           CALL    LOCATE
02780           LD      A,1FH           ;PRINT CHR$(31) - ERASE TO END OF DISPLAY
02790           CALL    DSP
02800           LD      H,22            ;POSITION CURSOR AT LINE 22
02810           LD      L,19            ;COLUMN 19
02820           CALL    LOCATE
02830           LD      HL,DONE         ;DISPLAY DONE MESSAGE
02840           CALL    CHROUT
02850           CALL    ANYSUB          ;DISPLAY ANYKEY MESSAGE
02860           JP      BEGIN           ;JUMP TO BEGIN
02870 ; ** THERE ARE NO VISIBLE USER FILES ON SELECTED DISK **
02880 ENPTY     LD      H,22            ;POSITION CURSOR AT LINE 22
02890           LD      L,0             ;COLUMN 0
02900           CALL    LOCATE
02910           LD      A,1FH           ;PRINT CHR$(31)
02920           CALL    DSP
02930           LD      H,22            ;POSITION CURSOR AT LINE 22
02940           LD      L,28            ;COLUMN 28
02950           CALL    LOCATE
02960           LD      HL,NOFIL        ;DISPLAY NOFIL MESSAGE
02970           CALL    CHROUT
02980           CALL    ANYSUB          ;DISPLAY ANYKEY MESSAGE
02990           JP      BEGIN           ;JUMP BACK TO BEGIN
03000 ; **** SCREEN MESSAGES ****
03010 MSG1      DEFB    21
03020           DEFB    143
03030           DEFB    244
03040           DEFB    245
03050           DEFB    246
03060           DEFB    32
03070           DEFB    32
03080           DEFB    239
03090           DEFB    32
03100           DEFM    '1986 Wolstrup Software'
03110           DEFB    21
03120           DEFB    0
03130 MSG2      DEFM    '**** R E M O V E 4 ****'
03140           DEFB    0
03150 MSG3      DEFM    'Remove all visible, non-protected '
03160           DEFM    'files on selected diskette.'
03170           DEFB    0
03180 WCHDRV    DEFM    'Remove files on which drive: '
03190           DEFB    0
03200 NDMSG1    DEFM    'Selected drive is not available'
03210           DEFB    0
03220 NDMSG2    DEFM    'Selected drive is not ready'
03230           DEFB    0
03240 REMMSG    DEFM    'Remove above files (Y/N) '
03250           DEFB    0
03260 REMFIL    DEFM    'Removing ---> '
03270           DEFB    0
03280 DONE      DEFM    'All visible, non-protected files removed'
03290           DEFB    0
03300 NOFIL     DEFM    'No visible files on disk'
03310           DEFB    0
03320 ANYKEY    DEFM    'Press any key to continue '
03330           DEFB    0
03340 ; **** BUFFERS ****
03350 SRCBUF    DEFS    1               ;HOLD SELECTED DRIVE NUMBER
03360 DIRBUF    DEFS    5589            ;HOLDS DIR INFO FROM @RANDIR - ENOUGH
03370                                   ;FOR 254 FILES + 1 BYTE FOR BUFEND
03380 BUFLOC    DEFS    2               ;HOLDS ADDRESS OF CURRENT PLACE IN
03390                                   ;DIRBUF
03400 FCB       DEFS    32              ;FILE CONTROL BLOCK
03410 IOBUF     DEFS    256             ;I/O BUFFER - MANDATORY WITH @OPEN SVC
03420           END     START
```

End

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Deskmate Printer Control

Use substitute characters to put your printer through its paces.

Deskmate for the Tandy 1000 does not allow you to place printer control codes within text. You can, however, control your printer within the text by using substitution characters, a procedure involving three steps:

- updating the configuration to include the printer driver;
- creating a table of substitution codes; and
- activating the table and inserting the codes into text.

Update the configuration by adding the following statement to Config.SYS:

```
DEVICE = LPDRVR.SYS
```

You can do this with Edlin. The easiest way to create Config.SYS is to copy statements to a file with that name from the console. At the DOS prompt type:

```
COPY CON CONFIG.SYS
OEVICE = ANSI.SYS
DEVICE = LPDRVR.SYS
^Z
```

Entering either control-Z or F6 terminates the Copy command and returns you to DOS. Refer to Appendix C of Tandy's *MS-DOS Reference Manual* (p. 309) for a further explanation of Config.SYS.

Creating the Substitution Characters

The second part of the procedure is more complex, since it uses the escape sequence that Appendix C describes. Before getting into this, identify a set of characters that you do not usually use in text files, such as the open brace ({), close brace (}), backslash (\), vertical bar (|), the difference sign (~) and ASCII 168 (¿). Then list the printer modes you want with their decimal and hexadecimal (hex) codes. You can find the codes in your printer manual. (For the DMP 120, they are on p. 35.)

The Table shows control-key conversions. You can find them in the scan-code list in Appendix B of the *MS-DOS Reference Manual* (p. 297). To determine the appropriate conversion, find the hex representation in the column labeled CTRL. The corresponding key is under the column titled Keyboard Legend. You will see the purpose of these codes as you create the table file.

Notice that 01B appears in the CTRL column as both the escape key and the symbol ^[(more on this later).

System Requirements

Tandy 1000
Deskmate
Printer

Construct the control-key conversion table using characters you don't usually use in text files.

The table follows the format of the escape sequence:

```
ESC W n code string
```

in which "n" is the number of characters in the printer code, "code" is the decimal representation of the substitution character, and "string" is the appropriate printer code. For example, in:

```
ESC W 01 123 15
```

the printer code is one decimal character, and in:

```
ESC W 02 092 27 14
```

it is two decimal characters. The decimal representations of { and \ are 123 and 092, respectively.

File CHR120.DAT contains the table. You can construct it using Basic or Edlin with the non-textual control characters you determined earlier. All alphabetic characters must be uppercase, so type:

```
EDLIN CHR120.DAT
```

at the DOS prompt.

Edlin returns:

```
New File
*
```

where "*" is the command prompt. Enter "I" for Insert, and Edlin returns the line number 1.*. Enter the following after the line number:

```
control-V
[W
control-A
{
control-O
```

The line appears as typed:

```
1.*^V[W^A{^O
```

Continue with the remaining lines as follows:

```
2.*^V[W^A}^N
3.*^V[W^B\^V[^N
4.*^V[W^B|^V[^O
5.*^V[W^B~^V[^T
6.*^V[W^B¿^V[^S
7.*^C
```

Entering control-C terminates the Insert command. The command prompt, followed by L, lists the following six lines:

```
1. ^[W^A{^O
2. ^[W^A}^N
3. ^[W^B\^[^N
4. ^[W^B|^[^O
5. ^[W^B~^[^T
6.*^[W^B¿^[^S
```

The command prompt (*) followed by E exits Edlin.

Substitute character	Printer mode	Decimal	Hex	Control-key couversion
{	start underline	15	0F	^O
}	end underline	14	0E	^N
\	start elongation	27 14	1B 0E	escape-^N
|	end elongation	27 15	1B 0F	escape-^O
~	start condensed	27 20	1B 14	escape-^T
¿	return to standard	27 19	1B 13	escape-^S

Table. Control-key conversions.

Circle 299 on Reader Service card.

An Explanation

Edlin uses the escape key to void current input. When it does so, all entries disappear. Its equivalent, ^[, serves the same purpose. Edlin lets you enter these apecial codes if you enter control-V followed by [to create an escape. This ts why the V disappears when the lines list.

The ^A and ^B commands designate the length of the string according to the format of the escape sequence. Hex values 001 and 002 (under the column heading CTRL of the scan-code table) represent keyboard entries ^A and ^B, respectively.

If you try to display this file using the DOS Type command, you will see a set of completely different characters, including arrows, smiling faces, music notes, and sunshines. These are the display-character equivalents of the ASCII code. The decimal equivalent of escape ts 027, which displays as a left arrow.

The last thing to do before entering Deskmate is to activate your control file. Do this with the DOS Print command by entering:

PRINT CHR120.DAT./P

Your printer should advance a blank page. If it prints any characters, an error probably exists in an escape sequence within the control file. To deactivate this control file, print a file containing ^X, which resets the printer driver.

If a blank page doesn't advance, an error may exist in the escape sequence of the control file.

The Figure shows the in-text command for underlining and the resulting output as an example. Now you can go to work creating your text in Deskmate.■

John Heenan designs products with his Tandy 1000 and is a free-lance writer. Write to him at 319 Belmont, Placentia, CA 92970.

{UNDERLINE. One should note that the underline continues under all spaces as well. This will not be true for all printers. On my DWP 210 the underline does not print under the spaces between words. The underline will continue until the End Underline character.}

```
UNDERLINE.
     One should note that the underline continues under all spaces as
well. This will not be true for all printers. On my DWP210 the
underline does not print under the spaces between words. The underline
will continue until the End Underline character.
```

Figure. Demonstration of the underlining control code and the resulting printout.

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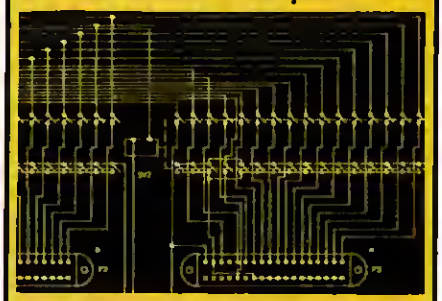

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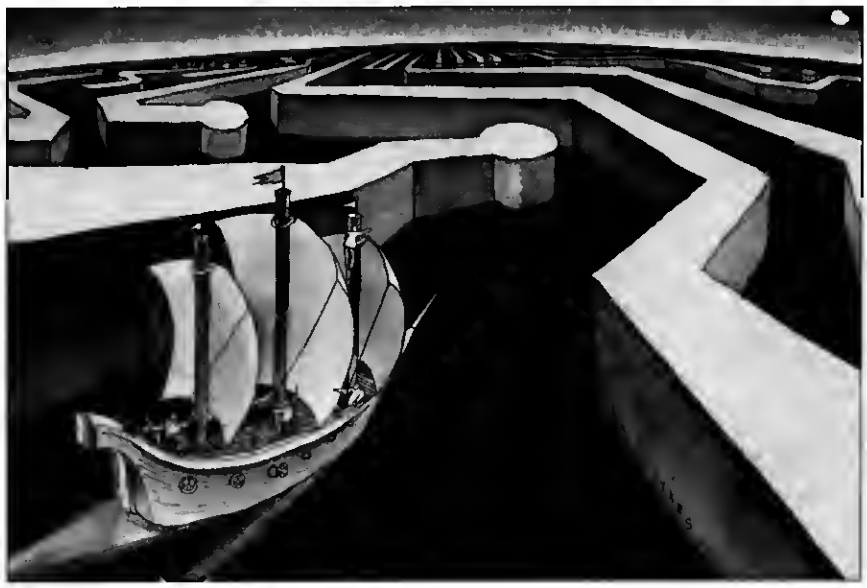

Illustration by John Dykes

Last month, I showed you how to execute a batch file from another batch file and then return. This month, I am going to show you how to spawn a second batch-file job that executes after the current batch file completes. I'll also show you how to execute commands without reloading the DOS command processor and how to change variables in your master environment.

Before I get into these uncharted areas, I want to expand on two topics from last month's column. I discussed accessing DOS environment variables from within a batch file and said that I used this technique to keep my path current without changing the path statement in a massive number of batch files.

For example, suppose my path statement lists 10 subdirectories that DOS is supposed to search. Suppose that I no longer need the files in the third subdirectory in the path and I delete them, removing the subdirectory from the disk. I would have to go through each batch file on the disk and change the path statements to ensure that this subdirectory is not present. If I miss one and use the batch file, I will get a message stating that an invalid drive or directory is in the search path each time DOS has to search for a program not in the current directory.

The simplest solution uses the DOS Set command, which I described last month. You can use this command to access any environment variable, including the Path and Prompt variables. This means that you do not have to worry about finding all of the Path statements in your batch files; set it once in the Autoexec file and forget it.

For example, suppose that my starting path includes the directories C:\, C:\DOS, C:\DOS\UTIL, and C:\GAMES. If I delete all of the files in the Games directory and then remove that directory, I must also take this directory name out of the Path statement or I will get an error when DOS looks for a file.

I have quite a few batch files, and if I forget one of them that contains a change to the path, I create an error condition. Let the Set command do youur work; the command SET PATH=C:\MSC;%PATH% appends the old value of the Path variable to the new string C:\MSC and stores it back in the environment as your working Path statement. This procedure does not care what the previous path was. Now you can change your Autoexec path at will without worry.

The second topic concerns the example of one batch file calling a second and returning. The second batch file makes changes in its environment that the first batch cannot access because the second batch has an entirely separate environment. Nice as it would seem, you cannot use this technique to pass parameters between invocations of batch files.

I do not think I stressed this inability to change environments enough—each task that operates under MS-DOS gets a private copy of the current environment, and no others can get to this area. But you can still change the master environment; that is one of the topics of this month's column.

DOS Mysteries

MS-DOS has many undocumented features—some are worth exploiting and have remained stable from DOS release to release. Others are less useful and change frequently. One of the more useful features is DOS interrupt 2EH, which provides a rapid entry point into the primary (or first loaded) resident DOS command interpreter. No matter how many layers or shells you have loaded, this in-

Fig. 1. Debug script for creating EXCMD.

```
a 0100
MOV     AH,[0080]
OR      AH,AH
JZ      0144
MOV     BX,01C0
SHR     BX,1
SHR     BX,1
SHR     BX,1
SHR     BX,1
INC     BX
MOV     AH,4A
INT     21
JB      0137
MOV     [01BE],SP
MOV     [01BC],SS
MOV     SI,0081
INT     2E
MOV     SP,CS:[01BE]
MOV     SS,CS:[01BC]
MOV     AH,4C
XOR     AL,AL
INT     21
MOV     AH,09
MOV     DX,0151
INT     21
MOV     AH,4C
MOV     AL,01
INT     21
```

Fig. continued

terrupt quickly and easily executes your DOS commands without your reloading Command.COM.

This has several advantages. First, loading Command.COM takes time—time to find it, open the file, and load it. Second, you might have removed the floppy disk with Command.COM on it and now get delayed while DOS waits for you to replace the disk. A disadvantage to this technique is that certain DOS programs use the entire free space of memory, which destroys the transient portion of Command.COM. The worst offender is a Turbo Pascal-compiled program.

Another significant advantage is the ability to modify the master environment to allow this interrupt function to execute a DOS Set command. For example, the command SET VARIABLE1 = STRING sets the environment variable Variable1 to String in the master environment. Note that these changes occur no matter how many levels you are nested because the DOS interrupt 2EH function processor always points to the primary-level command processor.

Using undocumented features can be dangerous, but I consider this case justified. It is present in all DOS releases from version 2.0 to 3.2. Since ADOS for protected-mode operation on the 80286 processors will probably be the next major release, I think you are safe in assuming that interrupt 2EH will remain available to the older DOS versions.

Examining EXCMD

The Program Listing contains the source code for EXCMD, which uses the remainder of its own command line as a command string to pass to DOS via interrupt 2EH. You can key this in directly and assemble it as I indicated in the leading comments. Figure 1 contains a Debug script to use in place of the assembly source code. Type in the statements in Fig. 1 and save them to a file called EXCMD.SCR. Then load Debug and use the command: DEBUG <EXCMD.SCR and press enter.

This is a simple program that illustrates several features. Most importantly, it demonstrates the use of memory-allocation requests to reduce the initial program's size. When DOS runs a COM program, it assigns all the remaining available memory to your task. This is not practical if you want to run any other process as a "child" of your current program, so you must calculate a maximum size you need and release the remaining memory to DOS.

Also, DOS interrupt 2EH has a disastrous variation from version 2 to 3. I initially developed this short program on an IBM PC under DOS 3.2, and every-

Fig. continued

```
        MOV     AH,09
        MOV     DX,017C
        INT     21
        MOV     AH,4C
        MOV     AL,01
        INT     21
        DB      7,7
        DB      'EXCMD - Fatal memory-allocation error!',d,a,'$'
        DB      'EXCMD - Command string required',d,a
        DB      'Command execution aborted!',d,a,'$'
```

Sample Batch File T1.BAT

```
dir/w
pause
excmd t2
rem This remark is executed after spawning off batch file T2
rem contents.
pause
```

Sample Batch File T2.BAT

```
rem In batch file number 2
pause
dir/p
pause
rem All done in batch file T2
```

Fig. 2. Example batch files.

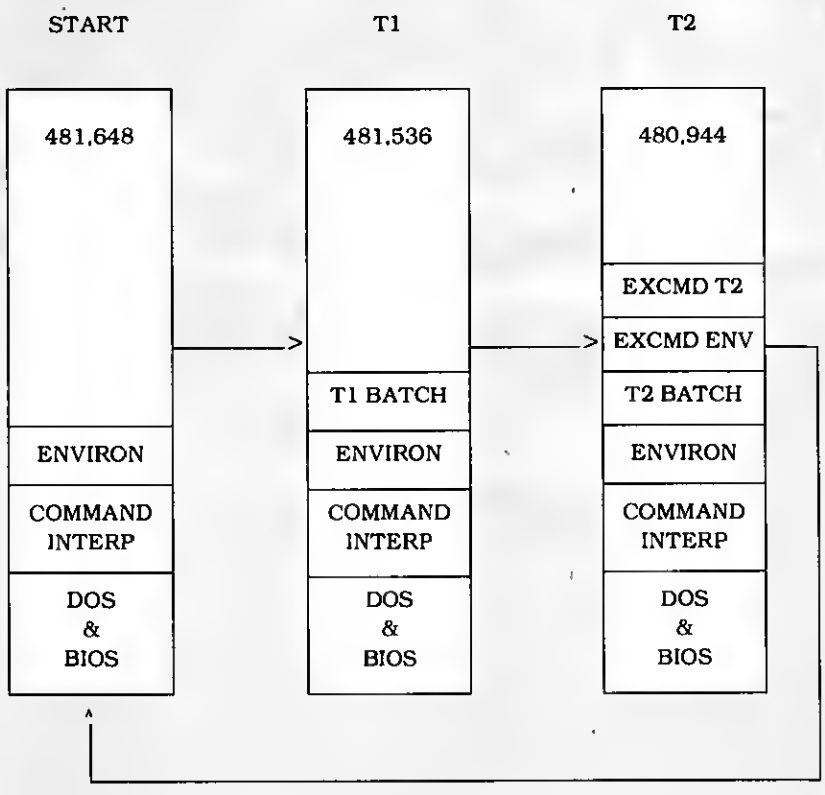

Fig. 3. Memory structures for the example batch files.

thing worked fine because the segment registers were protected. DOS 2 modifies all registers with the exception of CS and IP. Therefore, you must protect the stack pointer and segment registers.

Figure 2 contains two simple batch files to show what I initially claimed. If you type these in and execute them, a strange thing happens—batch file I runs completely to the end and finishes, and then batch file 2 starts to execute. It is almost as if you entered a command in the type-ahead buffer and then went on, letting the first batch file finish.

The diagram in Fig. 3 is a picture of memory while this example is running. First, DOS requires the amount of memory illustrated in the left box for itself, the basic input/output system (BIOS) code, the command interpreter, and the master environment. This uses 42,640 bytes out of my 512K memory (524,288 bytes). Depending on your DOS version, the number of files and buffers, and the device drivers loaded, your number could be more or less.

As the first batch file begins to execute, DOS creates a small memory block to control the batch file on top of the currently used memory (middle box). This reduces the total memory by 96 bytes for the control block. The extra difference between the left and middle boxes is 16 bytes allocated as a memory control header. Each block of memory allocated bears this header, which points to the beginning of the memory block and the size, among other information.

The right box shows the picture you get after batch file 2 is executing. Note that the EXCMD program is still resident with its private copy of the environment. The difference of 592 bytes between the middle and right boxes is composed of a 16-byte header and 96-byte block for EXCMD's environment and a 16-byte header and 464-byte block for EXCMD itself.

As soon as both batch files have completed, the memory allocation returns to the starting condition. DOS releases all unused blocks and returns them to the dynamic allocation pool.

Conclusion

EXCMD is another useful tool to add to your stock. You will have to experiment with it to appreciate its power. Batch files are valuable for effective use of your computer, especially if you have a hard disk.

I want to hear your needs and problems. Please write or contact me via Compuserve 73016,1326. I regularly attend the Tandy computer forum (TRS80PRO), and you can leave your questions via Easyplex.■

John B. Harrell III is a naval electronic warfare systems analyst. He has written for 80 Micro *for five years and programs in Pascal, C, and assembly language. Contact him c/o* 80 Micro, *80 Elm St., Peterborough, NH 03458.*

Program Listing. EXCMD.

```
            PAGE    ,132
            TITLE   EXCMD - Fast DOS Command Executer
            NAME    EXCMD

;*****************************************************************************
;*                                                                           *
;*   PROGRAM:                                                                *
;*               EXCMD executes DOS commands without reloading the DOS       *
;*               command processor.  This program uses an undocumented       *
;*               interrupt vector pointing to the system's primary (or       *
;*               first loaded) command processor.                            *
;*                                                                           *
;*               EXCMD uses DOS interrupt vector 2EH, which exists in all    *
;*               current versions of MS-DOS/PC-DOS from version 2.0 to       *
;*               the existing version 3.                                     *
;*                                                                           *
;*               Any DOS command, EXE program, COM program, or BAT file      *
;*               can be executed using this simple extension to DOS just     *
;*               as you would from the DOS command prompt.                   *
;*                                                                           *
;*   SYNOPSIS:                                                               *
;*               EXCMD [command line with optional parameters]               *
;*                                                                           *
;*   EXPLANATION:                                                            *
;*               DOS parses the command line above, leaving the              *
;*               bracketed command tail in the command line buffer in       *
;*               the current task's program segment prefix (PSP)             *
;*               beginning at offset 0080H.  This first byte is a count      *
;*               of the characters in the command tail minus the ending      *
;*               carriage return.  If the character count byte is zero,      *
;*               the command tail is absent.                                 *
;*                                                                           *
;*               EXCMD passes this command string contained in the tail      *
;*               directly to the primary command processor for action.       *
;*               Note that some DOS programs may contaminate the             *
;*               transient portion of COMMAND.COM and succeeding DOS         *
;*               commands might not execute properly.                        *
;*                                                                           *
;*               Also note that using any DOS command that modifies the      *
;*               operating system's environment WILL AFFECT ONLY THE         *
```

Listing continued

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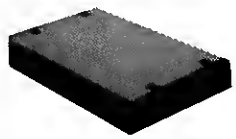

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```
;*                  PRIMARY OR MASTER ENVIRONMENT COPY.  Other environments   *
;*                  loaded on top of the primary environment will not         *
;*                  change.                                                   *
;*                                                                            *
;*    ASSEMBLING:                                                             *
;*                  To build an executable program file from the assembly     *
;*                  source, follow these simple steps after entering the      *
;*                  source code:                                              *
;*                                                                            *
;*                  1) MASM EXCMD;                                            *
;*                  2) LINK EXCMD;                                            *
;*                     Disregard the error message stating that there was     *
;*                     no stack segment.                                      *
;*                  3) EXE2BIN EXCMD EXCMD.COM                                *
;*                  4) Delete the resulting OBJ and EXE files.                *
;*                                                                            *
;*                                                                            *
;******************************************************************************

WriteString   = 09H                     ;Write string to standard output
SetBlock      = 4AH                     ;Set memory block to requested size
ExitFunction  = 4CH                     ;Terminate a process w/return code
DosCall       = 21H                     ;DOS command function processor
ExecInt       = 2EH                     ;Entry point into primary COMMAND.COM

;******************************************************************************
;*                                                                            *
;*                              MAIN CODE BODY                                *
;*                                                                            *
;******************************************************************************

CODE        SEGMENT PARA 'CODE'
            ASSUME  DS:CODE, CS:CODE, ES:NOTHING, SS:CODE

            ORG     0080H
PSP_Count   DB      ?
PSP_String  DB      127 DUP(?)


EXCMD       PROC    NEAR

            MOV     AH,PSP_Count
            OR      AH,AH               ;Test for command tail present
            JZ      CantExecute         ;Must have a command tail

            MOV     BX,OFFSET LastByte  ;Get last byte address
            SHR     BX,1
            SHR     BX,1
            SHR     BX,1
            SHR     BX,1                ;Divide by 16 for paragraphs
            INC     BX                  ;Add 1 for partial paragraph
            MOV     AH,SetBlock         ;Function to shrink memory
            INT     DosCall
            JC      FatalError          ;Fatal memory allocation error

            MOV     WORD PTR StackPtr,SP    ;Save stack pointer
            MOV     WORD PTR StackSeg,SS    ; and the segment register
            MOV     SI,OFFSET PSP_String    ;Point to command tail string
            INT     ExecInt             ;Call primary COMMAND.COM
            MOV     SP,WORD PTR CS:StackPtr ;Restore Stack Pointer
            MOV     SS,WORD PTR CS:StackSeg ; and segment register

            MOV     AH,ExitFunction     ;Return to DOS
            XOR     AL,AL               ;Set error code zero
            INT     DosCall

FatalError:
            MOV     AH,WriteString      ;Set DOS function code
            MOV     DX,OFFSET Error1Msg ;Point to string
            INT     DosCall
            MOV     AH,ExitFunction     ;Return to DOS with an "errorlevel"
            MOV     AL,1                ;code set
            INT     DosCall


CantExecute:
            MOV     AH,WriteString      ;Set DOS function code
            MOV     DX,OFFSET Error2Msg ;Point to string
            INT     DosCall
            MOV     AH,ExitFunction     ;Return to DOS with an "errorlevel"
            MOV     AL,1                ;code set
            INT     DosCall

EXCMD       ENDP

Error1Msg   DB      7,7,'EXCMD - Fatal memory allocation error!',13,10,'$'

Error2Msg   DB      7,7,'EXCMD - Command string required',13,10
            DB      'Command execution aborted!',13,10,'$'

StackSeg    DW      ?
StackPtr    DW      ?

LastByte    EQU     $                   ;Last byte of program + 1

CODE        ENDS

            END     EXCMD
```

End

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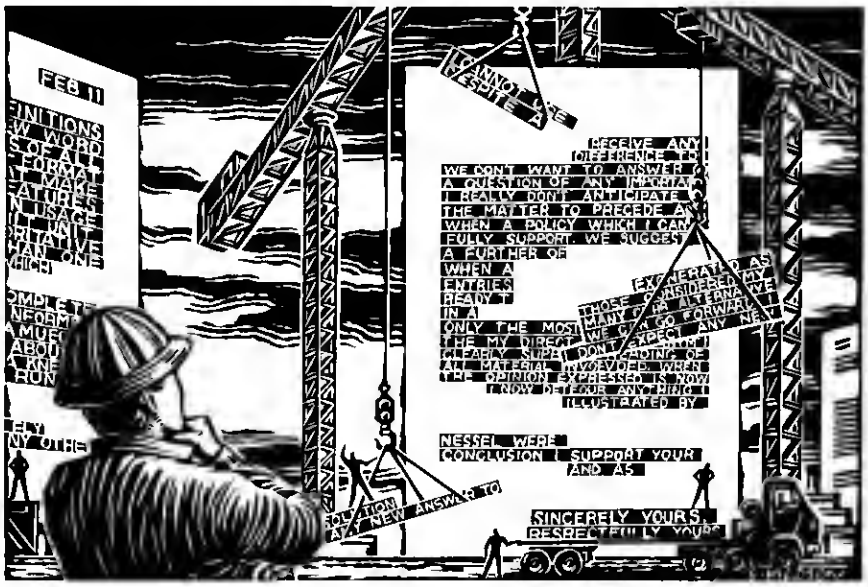
User-Supported Word Processors

Tandy didn't seem to have word processing in mind when it introduced the Model I nearly 10 years ago. It had no lowercase letters, and even the crudest dot-matrix printers were in the $2,000 range at the time.

Computers and printers have come a long way since then. Word processing is now a popular application. Commercial word processors abound, and a number of public-domain (PD) word processors rival the better commercial versions. I'll describe many of the MS-DOS PD word processors this month. Most are user-supported—also referred to as freeware or shareware. This means that, if you find the program useful, you are expected to make a donation to the author. See my April 1987 Public Works column (p. 122) for more information on user-supported software.



PC-Write

One of the more successful user-supported word processors is PC-Write. It is so successful that its author, Bob Wallace, has founded a company, Quicksoft Inc., to provide support to paid users and to improve PC-Write. This product has been updated many times since its beginning in 1983. The most recent version is 2.71. PC-Write is commonly found on bulletin-board systems (BBSes) around the country, though some do not have the latest version. It's hard to keep up with a program that has been revised so many times.

PC-Write includes an on-line spelling checker and dictionary. Other PD word processors also have this feature, but PC-Write's spelling checker works as you type. If you type a word that is not in its dictionary, PC-Write signals you with a beep. You can then either correct the spelling or add the word to an auxiliary dictionary.

Though the spelling checker is not the best in the world, it is sufficient for most tasks. If you want a better spelling checker, you can install Borland International's Turbo Lightning, a commercial spelling checker and thesaurus. Instructions for doing so are in the manual provided to contributing users.

PC-Write has probably the most extensive and easiest-to-use help utilities of all the PD word processors. These utilities

A number of PD word processors rival the commercial versions.

cover 45 topics ranging from the basics of using the program to footnoting, referencing, inserting headers and footers, and operating the spelling checker. They also tell you what you get for being a supporting user and provide a phone number to call for help. While most of Quicksoft's support service is for registered users, unregistered users may call for help getting started.

Quicksoft's main source of income comes from the extra support it provides. To start, you can buy the two program disks for trial from Quicksoft for $16. These disks include the full program and instructions, which you print out with a special program provided. If you like the program, you can then either buy the printed hard-bound manual for $45 or, as they say it, "really buy" PC-Write for $89, which covers registration.

The 350-page manual is professionally done. For your $89 you also get telephone support for one year, a quarterly newsletter, two free updates with disks and upgrade notes, and a $25 commission when someone else registers and gives the registration number from your disk.

PC-Write is easy to use and learn, making it good for beginners.

PC-Type +

Another prominent shareware author is Jim Button. Along with the late Andrew Fluegelman, who wrote PC-Talk and coined the term "freeware," he pioneered the user-supported concept. Jim is the founder of a company called Buttonware, which produces and distributes shareware programs that he and others wrote. One program distributed through Buttonware is a word processor called PC-Type +.

Buttonware's philosophy is to give the user the complete program and instructions, but to hold back on fully describing some of the more sophisticated features. When you register for PC-Type + by paying $69.95, you receive a 300-page manual, update notification, the latest version of the program, more detailed help disks, and a year of technical support.

The PC-Type + disk has three levels of help files. The first level uses screen help files that you call from within the program with the F1 key. The second level is a menu of 14 help files that you can

Illustration by Steven Madson

Circle 232 on Reader Service card.

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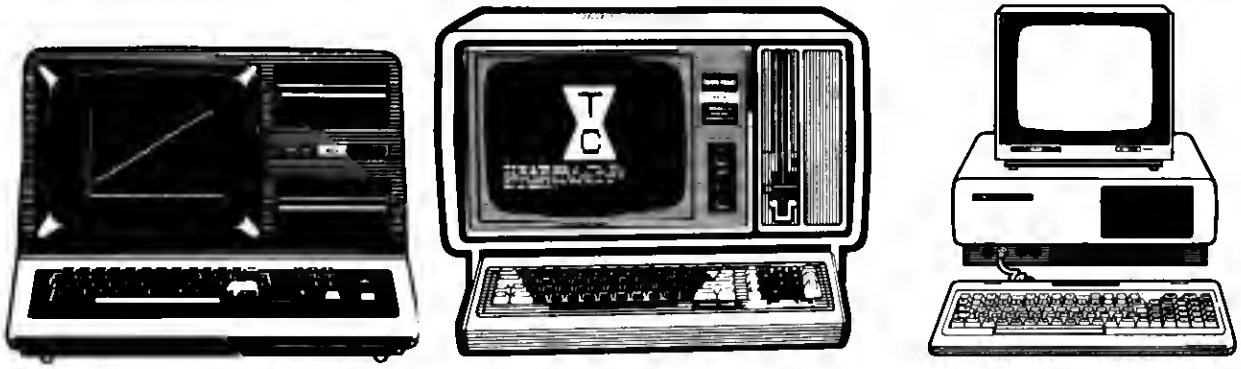

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select. In the third level, you select help on one of 64 topics.

PC-Type+ has no instruction manual on disk; you must become adept at using the help files. The help files are cumbersome and require guesswork to figure out how to access them.

The program and over 750K of supporting files reside on three disks. Most of the files are overlays and aren't resident while the program runs. A 20-megabyte hard drive is almost a necessity when using this program.

PC-Type+ has its own spelling checker and 100,000-word dictionary, but it does not check spelling as you type as does PC-Write. PC-Type+ does not guess which word you meant to type when it finds one not in its dictionary. PC-Write has this option, but it leaves a lot to be desired. PCMerge, a program to mail-merge files, and PCLabels, a program to print address labels, also come with PC-Type+.

New York Word

A lot of people in my area think that New York Word (NYW), written by Marc Adler, is a good word processor. NYW is a spin-off from a Unix word processor of the same name sold commercially by the author. NYW (version 2.1) not only has its own spelling checker and dictionary, but an automatic-hyphenation option, as well. For those of you who are interested, this option's code uses a cross between the Knuth automatic-hyphenation algorithm and the Gimpel algorithm. The spelling checker has a bug: It doesn't recognize misspelled words that end a sentence. It apparently considers words that end in a period as abbreviations.

NYW also has two calculator modes and can do limited graphics using ASCII line-drawing characters.

Though not as easy to use as PC-Write, NYW is much simpler than PC-Type+. Its on-line help files are easier to access than PC-Type+'s and more extensive than PC-Write's. Learning NYW's commands is probably harder than with PC-Write. If you are familiar with Wordstar, you can configure many of the keys to replicate the Wordstar commands. NYW has a set of utilities that can reconfigure keys to practically any one- or two-key combination. A file is already set up to configure to Wordstar. Another notable feature is the ability to generate a table of contents and an index.

Other than the help files, no instructions are provided on the disk. Registered owners (those who send a donation) receive a 100-page manual. The requested donation is $35. Registered users also receive mail-merge and label programs. Considering the price, NYW is an excellent value.

Wordplan

One of the newer word processors on the PD scene (version A.00.00) is Wordplan from DEA Software. Public Brand Software (P.O. Box 51315, Indianapolis, IN 46251, 800-426-3475), one of the distributors I wrote about last month, sent it to me. Public Brand gives Wordplan its highest rating: four stars and a trophy symbol meaning tremendous.

New York Word is a spin-off from a Unix commercial word processor.

Actually, DEA calls its word processor a "decision-support system generator." It has extensive math capabilities that are programmed into the text you create. Wordplan can even read 1-2-3 spreadsheet information directly from the spreadsheet file and print out tabulations and totals in a final report. There is no need to cut and paste information from the spreadsheet. DEA requests a $49.95 donation.

An internal modeling language within Wordplan determines which information from the spreadsheet is pertinent and makes the calculations for you. When you update the information in the spreadsheet, just call it from the Wordplan script that you create. It can also read files from the PD spreadsheet, As-Easy-As, or any DIF file such as from Dbase.

Wordplan does not have an on-line help feature, but you can implement many commands through pull-down menus much like those of Ashton-Tate's Framework II. A script file lets you print out a documentation file using Wordplan. Wordplan's editor is a modified version of Microstar from the Turbo Editor Toolbox by Borland.

Most of the commands are easy to use if you understand Wordstar. Wordplan does not have a spelling checker, though you can interface it with Borland's Turbo Lightning. Though Wordplan is itself a word processor, its documentation states that it can work well with PC-Write. You are probably better off using one of the other word processors if your word-processing needs are simple. Wordplan is best left to its intended special applications and is not for the faint of heart. I'm glad that I had the chance to use Wordplan, though. Its applications are unique.

New York Word, $35
Marc Adler
Magma Systems
138-23 Hoover Ave.
Jamaica, NY 11435

PC-Type+, $69.95
Buttonware Inc.
P.O. Box 5786
Bellevue, WA 98006
206-454-0479
800-528-8866 (order line only)

PC-Write, $89
Quicksoft Inc.
219 First North #224
Seattle, WA 98109
206-282-0452

Wordplan, $49.95
DEA Software
P.O. Box 968
Fremont, CA 94537
Disk only for $10

Table 1. User-supported word processors and where to get them.

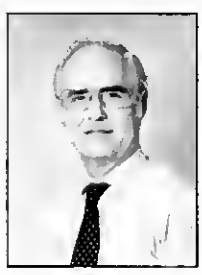
Next Month

I've covered only the more sophisticated word processors this month. Next month I'll describe a few simpler programs and survey a few word-processing support programs in the public domain. I'll even tell you about a word processor for kids.

As a convenience, I am again offering disks for *80 Micro* readers. The cost is $10 each for PC-Write, PC-Type+, and New York Word disk sets. If you send for more than one disk, just send $5 per disk and no extra shipping. Please don't ask for anything other than what I offer. It will delay things tremendously. If you want to write me, please do so separately.

Wordplan has a limited distribution system that precludes me offering a disk, though it is on the *80 Micro* BBS. You can order a disk from Public Brand Software (disk no. WP10.0) or the author for $10.

All PD software discussed in the Public Works column is available for downloading from the *80 Micro* BBS for a period of time at 603-924-6985 (300/1,200 baud, 8-bit words, no parity, 1 stop bit).■



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Low-cost business printer

The DMP 430 (26-1277, $699) allows a choice of micro, italic and double-high fonts, as well as bit-image graphics. Prints up to 180 characters per second.

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Pop-Up Printer Codes with Pro-Wam

Illustration by Mary Ann Smith

Your printer probably has several features that you rarely use—the ability to double-strike or emphasize characters, change fonts or font sizes, or change line spacing, for example. Printers require a sequence of control codes to perform such feats, and unless you are in Basic or using a word processor, it is difficult to send those codes to the printer.

I wanted a program that could access many of my printer's features. I wanted to select those options from TRSDOS Ready, from inside a text editor, or while using other programs. My printer-setup program should remember the codes necessary to select various printer features and let me redefine control-code sequences at any time.

This month's demonstration program comes very close to meeting those requirements and gives me a chance to discuss a number of techniques that I have not mentioned here before.

Although you can use many of the ideas in this month's program regardless of what software you own, it only runs as written with one of the most remarkable Model 4 programs I've seen: Misosys's Pro-Wam (formerly Pronto).

Pro-Wam is a set of pop-up utilities that are always available with a single keystroke. Pro-Wam allows an unlimited number of pop-up utilities, four of which you can designate to be available with two keystrokes. You can run the other utilities from disk.

Pro-Wam supports user-written, pop-up utilities for the assembly-language programmer. Its documentation tells you how to write your own utility applications, and this month's program demonstrates many of the necessary techniques. You can also make calls to the Pro-Wam window manager from programs written in any langauge; the extensions to Basic in LS-DOS 6.3 combined with Pro-Wam make windowed Basic programs easy to write.

Pro-Wam includes a utility that makes debugging pop-up utilities easier and a file containing macro commands for all of its calls.

System Requirements

Model 4, 4P, or 4D
128K RAM
Editor/assembler
(Pro-Create 4.3a or MRAS)
Available on The Disk Series
Pro-Wam

Designing an Application

A Pro-Wam pop-up utility (or application, as it is called in the program's documentation) must conform to the following restrictions.

- You must write the program to run in the memory area from 2800–2FFF hexadecimal (hex).
- The program can use any or all of the memory space from 2400–2FFF hex as data space.
- You must save the program as a core-image file, which means that it cannot contain any TRSDOS loading codes.
- The first sector of the program file must contain specific information as a Pro-Wam signature.

The Pro-Create or MRAS assemblers can handle most of these details without difficulty. Program Listing 1 begins by loading the macro commands in both MACLIB/ASM (see Program Listing 2) and Pro-Wam's Window/Mac file. It then establishes four constants that define its screen window. SRow and SCOL are the starting row and column for the window; NRow and NCOL define the window's total number of rows and columns.

Pro-Wam places a border around the window when it loads. It saves the screen contents and restores the screen and cursor position when it is finished.

The OPTION CI in line 320 of Listing 1 tells the assembler to create a core-image file (the same as a memory dump) instead of a normal CMD file with loader information. You could specify the assembler switch when assembling the program, but it is easier to place the command in the source code than to remember to specify it each time you assemble the listing.

Erases Old Responses

A program-specific macro command that prints prompts and information in the application window starts in line 340. Each time you invoke the macro, it copies a buffer from memory to the screen, erasing old prompts and responses, then prints the new information on a specified line of the application window.

The program starts on line 430 with the definition of the information sector that must precede every Pro-Wam application. The first six characters must be PRONTO, the next 12 characters must describe the application for the Pro-Wam

main menu, and the 19th character must be ETX, which terminates strings in TRSDOS programs when you do not want a carriage return. The program reserves the following 205 bytes for expansion. You can use the final 32 bytes of the information sector for invisible copyright information.

The program asks the assembler to use the expression in line 460 to count the bytes that should remain blank. In English, that line says, "Pad the rest of this sector with bytes of zero." The expression following the DC (define constant bytes) pseudo-op is not difficult to understand. It uses the current value of the program counter (the dollar sign [$]) and simple arithmetic to determine how many more bytes there are in the first sector of the program. Line 500 tests the result to ensure that the expression was written and evaluated correctly.

The program code begins at the Start label in line 530. The @WCreate macro creates a Pro-Wam window, if possible. If it cannot create the window, the program sends a beep through the Model 4's built-in speaker and then exits. Otherwise, it calls the Make_DISP routine to create a copy of the window display in a memory buffer. Any time the program wants to clear prompts or user responses from the screen, it simply asks Pro-Wam to copy that buffer back into its screen window.

The Main Loop Repeats Indefinitely

The main loop, lines 630–730, repeats until you want to exit the program. The loop asks you to press either "P" to send a control sequence to the printer or "D" to define or redefine a control sequence. If you press break while that prompt is on the screen, the program ends and writes any new information back to its file on disk. The main loop repeats indefinitely until you press break.

The rest of the program is a series of subroutines that perform most of the work. The first routine, Make_DISP, converts the current information in the program's data sector into a form that you can understand. Listing 1 stores information for 15 printer-control sequences. It stores each sequence as a nine-character identification string followed by up to eight bytes of printer-control characters.

Make_DISP creates a window buffer in memory, clears the buffer, and places each of the printer codes in that buffer. As it does so, it must change the bytes of the printer-control sequences into ASCII hex values. Invoking the @HEX8 supervisory call (SVC) in TRSDOS makes the job easier.

The program calls the second routine, Close, when you want to exit. Close's first job is determining whether you re-

Program Listing 1: Printer-setup application.

```
00100 ;=============================================================
00110 ;      Printer Setup Application
00120 ;         Requires PRO-WAM (formerly PRO-NTO) from Misosys
00130 ;
00140 ;      Assemble as PRSET/APP
00150 ;=============================================================
00160 ;
00170 *LIST OFF
00180 *GET    MACLIB/ASM              ;See Listing 2
00190 *GET    WINDOW/MAC              ;Supplied with PRO-WAM
00200 *LIST ON
00210 ;
00220 SROW    EQU     3
00230 SCOL    EQU     43
00240 NROW    EQU     20
00250 NCOL    EQU     36
00260 ;
00270 EREOL   EQU     1EH             ;Erase to end of line
00280 ETX     EQU     3
00290 CR      EQU     13
00300 LF      EQU     10
00310 ;
00320         OPTION  CI              ;Must be core image file
00330 ;
00340 PROMPT  MACRO   #STRING,#ROW     ;;Print prompt on bottom line
00350         @WB2W   DISP            ;;Reset screen
00360         @WSCUR  #ROW,0          ;;Cursor to beginning of bottom row
00370         @WDSPLY #STRING         ;;Display string
00380         ENDM
00390 ;
00400 ;----------
00410 ;  Information Sector
00420 ;----------
00430         ORG     2700H                   ;Forces start to 2800h
00440         DB      'PRONTO'                ;File identifier
00450         DB      'Set Printer ',ETX
00460         DC      .HIGH.$<8-$+256,0       ;Pad sector
00470 ;----------
00480 ;  Application starts here at 2800h
00490 ;----------
00500         IFNE    $,2800H                 ;Test location
00510           ERR     'Something is wrong in the header'
00520         ENDIF
00530 START:
00540         @WCREAT SROW,SCOL,NROW,NCOL
00550         JR      Z,OKAY                  ;If window open, begin
00560         @@SOUND 0,2                     ;Beep if not okay
00570         RET                             ; and leave
00580 OKAY    CALL    MAKE_DISP               ;Create window display in memory
00590 ;----------
00600 ;  Loop until user
00610 ;  wants out
00620 ;----------
00630 LOOP    PROMPT  MAIN_PRMT,NROW-1        ;Get user response
00640         @WKEYIN 0                       ;Get user response
00650         JP      C,CLOSE                 ;Go if <Break> pressed
00660         AND     0DFH                    ;For letter to upper case
00670         PUSH    AF                      ;Save response
00680         CP      'P'                     ;Send string to printer?
00690         CALL    Z,PRINT                 ;Yes -- go
00700         POP     AF                      ;Recover response
00710         CP      'D'                     ;Define a string?
00720         CALL    Z,S_DEFINE              ;Yes -- go
00730         JR      LOOP                    ;Loop back and do it again
00740 ;----------
00750 ;  Create ASCII display
00760 ;  in PRO-WAM data area
00770 ;----------
00780 MAKE_DISP:
00790         HEMFILL DISP,NROW*NCOL,' '      ;Clear display area
00800         MOVE    TITLE,DISP,TITLE_LEN    ;Move title to display area
00810         LD      HL,NCOL*2+DISP          ;HL ==> 3rd line
00820         LD      DE,DEF                  ;DE ==> definitions
00830         LD      B,15                    ;15 strings max
00840         LD      A,'A'                   ;ID of first string
00850         LD      (LETTR$),A              ;Save it
00860 MD_1    PUSH    BC                      ;Keep loop counter
00870         LD      A,(LETTR$)              ;Get display letter
00880         LD      (HL),A                  ;Place the ID character
00890         INC     A                       ;Next ID character
00900         LD      (LETTR$),A              ;Save next one
00910         INC     HL                      ;Point to next location
00920         LD      (HL),'.'                ;Print period
00930         INC     HL                      ;Point to next
00940         INC     HL                      ;Skip a space
00950         EX      DE,HL                   ;Exchange pointers
00960         LD      BC,9                    ;Nine characters in name
00970         LDIR                            ;Move nine characters
00980         EX      DE,HL                   ;HL==> next space, DE==> hex data
00990         LD      B,8                     ;8 data bytes
01000 MD_2    PUSH    BC                      ;Save loop counter
01010         INC     HL                      ;Skip a space
01020         LD      A,(DE)                  ;Get data byte
01030         OR      A                       ;Is it 0?
01040         JR      Z,MD_4                  ;Yes -- go
01050         LD      C,A                     ;Else byte in C
01060         @@HEX8                          ;Convert to ASCII hex
01070 MD_3    POP     BC                      ;Get loop counter
```

Listing 1 continued

Listing 1 continued

```
01080           INC     DE                      ;Bump pointer
01090           DJNZ    MD_2                    ;Loop for all bytes
01100           JR      MD_5                    ;Complete outer loop
01110 MD_4      INC     HL                      ;If 0, leave spaces
01120           INC     HL
01130           JR      MD_3                    ;Complete inner loop
01140 MD_5      POP     BC                      ;Recover outer loop counter
01150           DJNZ    MD_1                    ;And loop for all strings
01160           RET                             ;Display is complete
01170 ;----------
01180 ;  Close up, save new definitions
01190 ;----------
01200 CLOSE     LD      A,(CHANGE$)             ;Did user change definitions?
01210           OR      A                       ;Test if 0
01220           JR      Z,CL_3                  ;No changes made -- leave program
01230           @@FSPEC PROGNAM,FCB             ;Set up FCB for open
01240           DEFINE  @OPEN,3BH               ;Handle OPEN directly to trap
01250           LD      HL,DEF                  ;Point to buffer
01260           LD      B,0                     ;LRL = 256
01270           SVC     @OPEN                   ;Open the file
01280           JR      Z,CL_2                  ;Go if no error
01290           PROMPT  OPEN_ERR,NROW-2         ;Else report error
01300 CL_1      @WKEYIN 0                       ;Wait for keystroke
01310           JP      C,LOOP                  ;Main loop if <Break>
01320           AND     0DFH                    ;Else make upper-case
01330           CP      'N'                     ;Don't quit?
01340           JP      Z,LOOP                  ;  Then return to main loop
01350           CP      'Y'                     ;Do quit?
01360           JR      Z,CL_3                  ;  Then leave program
01370           JR      CL_1                    ;Else wait for correct response
01380 CL_2      @@POSN  DATSEC                  ;Position record to data
01390           @@WRITE                         ;Write data to disk
01400           @@CLOSE                         ;Close the file
01410 CL_3      @WCLOSE                         ;Close our window
01420           RET                             ;We're done -- control to PRO-WAM
01430 ;----------
01440 ;  Send existing setup
01450 ;  string to printer
01460 ;----------
01470 PRINT     PROMPT  PRT_PRMT,NROW-1         ;Display prompt message
01480           CALL    SELECT_LINE             ;Pick line to print
01490           RET     C                       ;Go if <Break>
01500           CALL    SEND_PRT                ;Else send value to printer
01510           RET                             ;And leave
01520 ;----------
01530 ;  Select line for printing
01540 ;  or definition.  Return line
01550 ;  ID (0 - 14) in A or CF if <Break>
01560 ;----------
01570 SELECT_LINE:
01580           @WKEYIN 0                       ;Get one keystroke
01590           RET     C                       ;Return if <Break>
01600           AND     0DFH                    ;Force to upper-case
01610           IFLT_JR 'A',SELECT_LINE         ;Loop if too low
01620           IFGE_JR 'P',SELECT_LINE         ;Loop if too high
01630           SUB     'A'                     ;Make relative to 0
01640           RET
01650 ;----------
01660 ;  Send setup string to printer
01670 ;----------
01680 SEND_PRT:
01690           @@MUL16 17,A                    ;Offset to selected string
01700           LD      H,L                     ;Shift result
01710           LD      L,A                     ;  to HL
01720           LD      DE,DEF                  ;DE ==> definitions
01730           ADD     HL,DE                   ;HL ==> beginning of ID string
01740           LD      DE,9                    ;Characters in string
01750           ADD     HL,DE                   ;HL ==> first data byte
01760           LD      B,8                     ;Up to 8 data bytes
01770 SP_1      LD      A,(HL)                  ;Get byte
01780           INC     HL                      ;Bump pointer
01790           OR      A                       ;Is it 0?
01800           JR      Z,SP_2                  ;Go if yes
01810           @@PRT   A                       ;Else print character
01820 SP_2      DJNZ    SP_1                    ;Loop for all characters
01830           RET
01840 ;----------
01850 ;  Define new setup string
01860 ;----------
01870 S_DEFINE:
01880           PROMPT  SEL_PRMT1,NROW-2        ;Ask for string to define
01890           CALL    SELECT_LINE             ;Get user response
01900           RET     C                       ;Return on <Break>
01910           LD      (LETTR$),A              ;Save response
01920           PROMPT  SEL_PRMT2,NROW-2        ;Ask for ID
01930           MEMFILL IDBUF,10,CR             ;Clear ID buffer
01940           @WKEYIN 9,IDBUF                 ;Get input
01950           JR      C,S_DEFINE              ;Loop back if <Break>
01960           LD      A,B                     ;Get number of characters
01970           OR      A                       ;Were there any?
01980           JR      Z,S_DEFINE              ;Loop if none
01990           MEMFILL HEXBUF,24,0             ;Clear input buf
02000           PROMPT  SEL_PRMT3,NROW-2        ;Ask for hex bytes
02010           @WKEYIN 23,HEXBUF               ;Get input
02020           JP      C,S_DEFINE              ;Loop back if <Break>
02030           LD      A,B                     ;Get length of input
02040           OR      A                       ;Was there any?
02050           JP      Z,S_DEFINE              ;No -- loop back
02060           CALL    HEXTEST                 ;Test input
```

Listing 1 continued

defined any of the control sequences or added any new ones. If you made any changes, Close saves the printer-control data back to disk before returning to Pro-Wam and the program that was running when you invoked Pro-Wam.

There are two ways to save the control information, and each represents a trade-off. If the program saves new control data to a data file, it has to pause to find and read that file whenever you invoke it. On a floppy-based system, you must leave the disk containing the data file in one of the drives at all times.

An Option to Save

In the other option the program saves the control-sequence data into itself, so that the data is available whenever you load the program. This is a handy technique to use for short utilities that need little user-defined data. The program opens the disk copy of itself, finds the appropriate sector, and writes one or more records into itself. The program never loses time looking for a data file when you invoke it, and there is little chance that the data and program files will end up on separate disks.

The disadvantage of the latter method is that Pro-Wam keeps a copy of four selected programs in a back bank of memory. It cannot know that you altered one of those programs, and will not display the new data the next time that you invoke it, unless you reboot or remove Pro-Wam from memory and reload it with its associated files.

Speedy but Inconvenient

In spite of this inconvenience, I chose to implement Listing 1 using the second strategy. I found that once I defined my printer's most common control sequences, I seldom wanted to alter any of them. I appreciate the program's speed (it never has to look for a data file) more than I dislike the inconvenience of having to remove and reload Pro-Wam whenever I want to preserve new control-sequence definitions.

If the Close routine finds that you changed any definitions, it trys to open PRSET/APP (the filespec I use for the application program). If the open operation is successful, Close positions the file to the last sector (which is where the data resides) and writes the new contents of the data area into that sector. If the open operation is unsuccessful, the program reports an error and lets you decide whether to end anyway or return to the main loop (and perhaps load the disk containing PRSET/APP into one of the computer's drives). The program ends by telling Pro-Wam to close its window and then returns control to Pro-Wam.

Most of the remaining routines are

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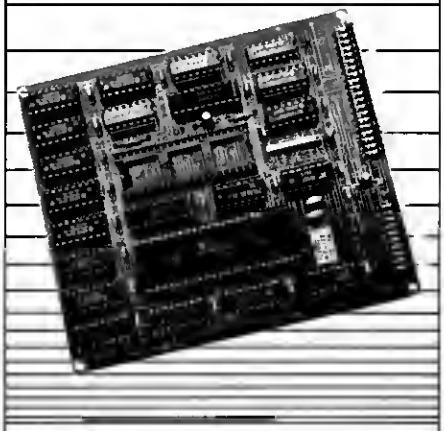
4, 4D, 4P



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Listing 1 continued

```
02070          JP       C,S_DEFINE                    ;Loop back if not okay
02080          CALL     XFER_STRING           ;Move id and hex string
02090          CALL     MAKE_DISP             ;Make new display
02100          LD       A,-1                  ;Value for change flag
02110          LD       (CHANGE$),A           ;Store flag to show change
02120          RET                            ;And return
02130 ;----------
02140 ;  Test hex input for correct form
02150 ;----------
02160 HEXTEST LD        HL,HEXBUF             ;HL ==> hex input buffer
02170 HEX_1    CALL     ISHEX                 ;Is first character hex?
02180          RET      C                     ;Go if not
02190          CALL     ISHEX                 ;Is next character hex?
02200          RET      C                     ;Go if not
02210          LD       A,(HL)                ;Get next character
02220          IFEQ_JR  CR,HEXOKAY            ;Go if at end
02230          CALL     ISSEP                 ;Valid separator?
02240          RET      C                     ;Go if not
02250          LD       A,(HL)                ;Get next character
02260          IFNE_JR  CR,HEX_1              ;Loop back if not end
02270 HEXOKAY XOR       A                     ;Clear carry flag
02280          RET                            ;We're done
02290 ;----------
02300 ;  Test if (HL) is a valid hex
02310 ;  character.
02320 ;  If okay -- reset CF and inc HL
02330 ;  If not okay, set CF
02340 ;----------
02350 ISHEX    LD       A,(HL)                ;get character
02360          CP       '0'                   ;Special chacter?
02370          RET      C                     ;Go if < 0
02380          CP       '9'+1                 ;Is it decimal?
02390          JR       C,ISH_OK              ;Go if okay
02400          AND      0DFH                  ;Force a-f to A-F
02410          LD       (HL),A                ;And put it back
02420          CP       'A'                   ;Between 3B and 40 hex?
02430          RET      C                     ;Yes -- go
02440          CP       'F'+1                 ;Above 46h?
02450 ISH_OK   CCF                            ;Reverse carry flag
02460          RET      C                     ;Return if error
02470          INC      HL                    ;Else bump pointer
02480          RET                            ;And return
02490 ;----------
02500 ;  Test if (HL) is a valid
02510 ;  separator (' ' <-> '/')
02520 ;  Set CF is not, else convert
02530 ;  to ' ', reset CF, and inc HL
02540 ;----------
02550 ISSEP    LD       A,(HL)                ;Get character
02560          CP       ' '                   ;Too low?
02570          RET      C                     ;Yes -- return
02580          CP       '/'+1                 ;Over the top?
02590          CCF                            ;Reverse carry flag
02600          RET      C                     ;Return if not legal
02610          LD       A,' '                 ;Else get a space
02620          LD       (HL),A                ;Convert character to space
02630          INC      HL                    ;Point to next char.
02640          RET
02650 ;----------
02660 ;  Move new user data into the DEF area
02670 ;----------
02680 XFER_STRING:
02690          LD       HL,IDBUF              ;Point to ASCII buffer
02700          PUSH     HL                    ;Save address
02710          LD       B,9                   ;Size of ID string
02720 XFER_1   LD       A,(HL)                ;Get character
02730          IFNE_JR  CR,XFER_2             ;Go if not CR
02740          LD       (HL),' '              ;Else replace with ' '
02750 XFER_2   INC      HL                    ;Point to next character
02760          DJNZ     XFER_1                ;Loop for all 9 characters
02770          LD       A,(LETTR$)            ;Get string we're working with
02780          @@MUL16  17,A                  ;Multiply by entry length
02790          LD       H,L                   ;Shift result
02800          LD       L,A                   ;  to HL
02810          LD       DE,DEF                ;DE ==> definitions area
02820          ADD      HL,DE                 ;HL ==> string space
02830          EX       DE,HL                 ;Move pointer to DE
02840          LD       BC,9                  ;Size of ID string
02850          POP      HL                    ;Get pointer
02860          LDIR                           ;Move it all
02870          LD       B,0                   ;Max number of entries
02880          LD       HL,HEXBUF             ;HL ==> hex input buffer
02890 XFER_3   LD       A,(HL)                ;Get character
02900          INC      HL                    ;Bump pointer
02910          IFEQ_JR  ' ',XFER_3            ;Get next if a space
02920          IFEQ_JR  CR,XFER_4             ;Go if at end
02930          PUSH     BC                    ;Else save counter
02940          SUB      '0'                   ;Convert to binary
02950          CP       10                    ;Is it 0 - 9 ?
02960          JR       C,$+4                 ;Yes -- skip next instruction
02970          SUB      7                     ;Else convert A - F
02980          SLA      A                     ;Multiply by 16
02990          SLA      A
03000          SLA      A
03010          SLA      A
03020          LD       C,A                   ;Store in C
03030          LD       A,(HL)                ;Get next character
03040          INC      HL                    ;Bump pointer
03050          SUB      '0'                   ;Convert to binary
```

Listing 1 continued

short and easy to understand. Print (lines 1470–1510) asks which control sequence you want to print and then calls a second subroutine (Select_Line) to send that sequence to the printer.

Select_Line waits for you to type a character that selects one of the 15 possible printer codes and then returns that value to the routine that called it. Another subroutine, Send_PRT, finds the selected printer-control bytes in memory and sends them to the printer, skipping over any zero bytes in the process.

The S_Define routine lets you define a control sequence. S_Define asks you which of the 15 sequences you want redefined and prompts for both a nine-character title and eight hex bytes. You type in each byte as two hex digits followed by a space or other separator. (The legal separators are any ASCII characters less than zero—the same separators that TRSDOS allows for a log-on date.)

After you enter the new information, S_Define calls Make_Disp to create a new display buffer in memory, and sets the Change$ flag byte to indicate that you made a change. If you press break to avoid defining a new control sequence, you will not alter the display buffer or the Change$ byte.

S_Define calls a routine called Hextest to validate your input. Hextest, which calls two shorter routines, scans through the list of control bytes that you typed in and verifies that each is either a valid hex digit or a valid separator. If it finds an invalid character, Hextest returns with the carry flag set to indicate an operator error.

The last long routine, XFER_String, stores your new definition in the data area in a form that you can copy back to disk. The only difficult part of this routine is the code that converts ASCII hex into bytes (TRSDOS has no SVC to make the conversion). When the XFER_String routine finds the carriage return at the end of your input, it pads the remainder of the identification string with spaces and the remainder of the printer-control sequence with zero bytes.

The Data Sections

Pro-Wam's set of macros includes a command called $DS. $DS defines space inside the data area from 2700–27FF hex. Listing 1, however, requires more data space than that. The label that $DS uses, Data$, intializes to the very beginning of the data area (2400 hex).

The $DS macro assigns each of the temporary values space in the data area. At the end of that data section, it checks Data$ to ensure that the program has not overflowed the data area.

The second set of data definitions includes various messages and the

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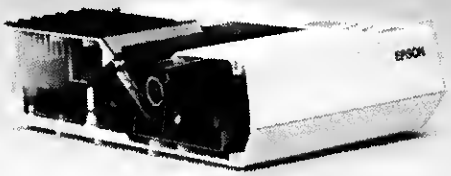

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Change$ flag, which you must initialize to zero (no change). There is nothing unusual about these definitions.

The last section of the data area is unusual. Padding the program with zero bytes moves the program counter to an even page and sector boundary. The program calculates which will be the final sector, knowing that its first sector loads at 2700 hex. Finally, the REPT macro intializes 15 sequences of nine spaces and eight zero bytes.

This technique of defining data at the end of a program doesn't work the same way for most CMD programs. The source code has no control over the loader information required in a TRSDOS program file. The technique only works for programs that you can save as core-image files without loader codes.

Debugging and Using the Program

When you finish assembling the program, test it and, if necessary, debug it using the PRun utility included with Pro-Wam. Load Pro-Wam into memory and then enter PRUN PRSET to test the program. It should run normally, let you define printer sequences, and send those sequences to your printer.

If the program doesn't work, enter PRUN PRSET (D) to run the program under Debug.

When you are sure the program works correctly, add it to the set of four programs that Pro-Wam loads automatically. When you define a new set of control codes, the program first expects an identification string of nine or fewer characters and then expects you to enter the hex control codes in a specific form. You must follow each two-character hex byte with a space or other separator. If you omit the separators, the program rejects your entry and asks you to enter the control codes again.

If you want to remove a definition from the list, enter a single space as the identification string and 00 as the hex sequence. The program interprets this as a command to erase the previous printer code.

Pro-Wam is available from Misosys Inc., P.O. Box 239, Sterlind, VA 22170-0239, 800-647-6797, for $59.95.■

Write Hardin Brothers at 280 N. Campus Ave., Upland, CA 91786. Enclose a stamped, self-addressed envelope for a reply. You can also contact Hardin on Compuserve's WE-SIG (PCS-117).

Listing 1 continued

```
03060           CP      10                      ;Is it 0 - 9
03070           JR      C,$+4                   ;Yes -- skip next
03080           SUB     7                       ;Else convert A - F
03090           ADD     A,C                     ;Merge in first byte
03100           LD      (DE),A                  ;Save value
03110           INC     DE                      ;Bump pointer
03120           POP     BC                      ;Recover count
03130           DJNZ    XFER_3                  ;And loop back
03140 XFER_4    LD      A,0                     ;Pad with 0 bytes
03150           LD      (DE),A                  ;Save it
03160           INC     DE                      ;Bump pointer
03170           DJNZ    XFER_4                  ;And loop back till done
03180           RET
03190 ;----------
03200 ;  Data definitions
03210 ;----------
03220 DATA$     DEFL    2400H                   ;Set DATA$ to beginning of data area
03230           $DS     FCB,32                  ;Put in PRO-WAM data area
03240 DISPLEN   EQU     NROW*NCOL
03250           $DS     DISP,DISPLEN
03260           $DS     LETTR$,1
03270           $DS     IDBUF,10
03280           $DS     HEXBUP,24
03290           IFGT    DATA$,27FFH
03300 OVER      DW      DATA$
03310             ERR     DATA AREA OVERFLOW
03320           ENDIF
03330 TITLE             DB      '     Printer Setup Application'
03340 TITLE_LEN         EQU     $-TITLE
03350 PROGNAM           DB      'PRSET/APP',0
03360 MAIN_PRMT         DB      '<P>rinter setup or <D>efine -->',ETX
03370 PRT_PRMT          DB      'Print which sequence (A-O) --> ',ETX
03380 SEL_PRMT1         DB      'Define which sequence (A-O) --> ',ETX
03390 SEL_PRMT2         DB      'Description --> ',ETX
03400 SEL_PRMT3         DB      'Hex sequence --> ',CR
03410 OPEN_ERR          DB      'Cannot open PRSET/APP to save ',LF
03420                   DB      'new data.  Quit anyway (y/n) -->',ETX
03430 CHANGE$           DB      0               ;No changes yet
03440 ;----------
03450 ;  Force to next sector
03460 ;----------
03470           DC      .HIGH.$.SHL.8-$+256,0
03480           IFGT    $,2DFFH
03490             ERR     'Program is too long'
03500           ENDIF
03510 DATSEC    EQU     .HIGH.$-27H             ;Sector holding DEF
03520 DEF       REPT    15
03530           DC      9,' '                   ;9 characters for each seq.
03540           DC      8,0                     ;8 bytes for each seq.
03550           ENDM
03560           END
```

End

Program Listing 2: Macro commands for Listing 1.

```
00100 ;-----------------------------------------
00110 ;  Macro Commands Used with PRSET/APP
00120 ;
00130 ;  Name this file Maclib/Asm or add new
00140 ;  macros to your own Maclib/Asm file
00150 ;-----------------------------------------
00160 ;-----------------------------------------
00170 ;   @@CLOSE -- Close a file or device
00180 ;   #FCB defaults to value in DE
00190 ;   AF is altered
00200 ;-----------------------------------------
00210 @@CLOSE MACRO   #FCB
00220         DEFINE  @CLOSE,3CH
00230         IFEQ    %%,1
00240           PUSH    DE
00250           LD      DE,#FCB
00260         ENDIF
00270         SVC     @CLOSE,CHECK
00280         IFEQ    %%,1
00290           POP     DE
00300         ENDIF
00310         ENDM
00320 ;
00330 ;-----------------------------------------
00340 ;   DEFINE -- Define a lable unless it
00350 ;       is already defined.
00360 ;-----------------------------------------
00370 DEFINE  MACRO   #LABEL,#VALUE
00380         IFNDEF  #LABEL
00390 #LABEL  EQU     #VALUE
00400         ENDIF
00410         ENDM
00420 ;
00430 ;-----------------------------------------
00440 ;   @@FSPEC -- Move filespec or devspec
00450 ;       to an FCB or DCB
00460 ;   Test Z / NZ after using!
00470 ;   #Fname and #FCB are both required.
00480 ;   If #Fname is already in HL, use HL as filename
00490 ;   DE is set to #FCB
00500 ;   AF is altered.
00510 ;-----------------------------------------
00520 @@FSPEC MACRO   #FNAME,#FCB
00530         DEFINE  @FSPEC,4EH
```

Listing 2 continued

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Listing 2 continued

```
00540          RPUSH   BC,HL
00550          IFNE$   #FNAME,HL
00560            LD      HL,#FNAME
00570          ENDIF
00580          LD      DE,#FCB
00590          SVC     @FSPEC
00600          RPOP    HL,BC
00610          ENDM
00620 ;
00630 ;-----------------------------------------
00640 ;  @@HEX8 -- Convert 1 byte to ASCII Hex
00650 ;    #Byte defaults to value in C
00660 ;    #Buf  defaults to value in HL
00670 ;-----------------------------------------
00680 @@HEX8  MACRO   #BYTE,#BUF
00690          DEFINE  @HEX8,62H
00700          IFGT    %%,0
00710           PUSH    BC
00720           LD      A,#BYTE
00730           LD      C,A
00740          ENDIF
00750          IFEQ    %%,2
00760           PUSH    HL
00770           LD      HL,#BUF
00780          ENDIF
00790          SVC     @HEX8
00800          IFGT    %%,0
00810           IFEQ    %%,2
00820            POP     HL
00830           ENDIF
00840           POP     BC
00850          ENDIF
00860          ENDM
00870 ;
00880 ;-----------------------------------------
00890 ;  IFEQ_JR -- Performs a JR if A = #Value
00900 ;-----------------------------------------
00910 IFEQ_JR MACRO   #VALUE,#JUMP
00920          CP      #VALUE
00930          JR      Z,#JUMP
00940          ENDM
00950 ;
00960 ;-----------------------------------------
00970 ;  IFGE_JR -- Performs a JR if A >= #Value
00980 ;-----------------------------------------
00990 IFGE_JR MACRO   #VALUE,#JUMP
01000          CP      #VALUE
01010          JR      NC,#JUMP
01020          ENDM
01030 ;
01040 ;-----------------------------------------
01050 ;  IFLT_JR -- Performs a JR if A < #Value
01060 ;-----------------------------------------
01070 IFLT_JR MACRO   #VALUE,#JUMP
01080          CP      #VALUE
01090          JR      C,#JUMP
01100          ENDM
01110 ;
01120 ;-----------------------------------------
01130 ;  IFNE_JR -- Performs a JR if A <> #Value
01140 ;-----------------------------------------
01150 IFNE_JR MACRO   #VALUE,#JUMP
01160          CP      #VALUE
01170          JR      NZ,#JUMP
01180          ENDM
01190 ;
01200 ;-----------------------------------------
01210 ;  MEMFILL -- Fill memory with a constant byte
01220 ;    All three parameters required
01230 ;-----------------------------------------
01240 MEMFILL MACRO   #ADDR,#LEN,#BYTE
01250          RPUSH   BC,DE,HL
01260          LD      HL,#ADDR
01270          LD      DE,#ADDR+1
01280          LD      BC,#LEN-1
01290          LD      (HL),#BYTE
01300          LDIR
01310          RPOP    HL,DE,BC
01320          ENDM
01330 ;
01340 ;-----------------------------------------
01350 ;  MOVE -- Moves a block of memory from
01360 ;    #src to #dest.  Block is #len bytes long.
01370 ;    All three parameters must be specified.
01380 ;-----------------------------------------
01390 MOVE    MACRO   #SRC,#DEST,#LEN
01400          IFLT    %%,3
01410           ERR     TOO FEW PARAMETERS IN MOVE
01420          ENDIF
01430          RPUSH   BC,DE,HL
01440          LD      BC,#LEN
01450          IFGT    #SRC,#DEST
01460           LD      HL,#SRC
01470           LD      DE,#DEST
01480           LDIR
01490          ELSE
01500           LD      HL,#SRC+#LEN-1
01510           LD      DE,#DEST+#LEN-1
01520           LDDR
01530          ENDIF
01540          RPOP    HL,DE,BC
01550          ENDM
01560 ;
01570 ;-----------------------------------------
01580 ;  @@MUL16 -- Multiplies 16-bit by 8-bit value
01590 ;     If values aren't specified, defaults to
01600 ;     values in HL and C
01610 ;     Result in HL and A
01620 ;-----------------------------------------
01630 @@MUL16 MACRO   #VAL16,#VAL8
01640          DEFINE  @MUL16,5BH
01650          PUSH    DE
01660          IFEQ    %%,2
01670            LD      HL,#VAL16
01680            LD      A,#VAL8
01690            LD      C,A
01700          ENDIF
01710          SVC     @MUL16
01720          POP     DE
01730          ENDM
01740 ;
01750 ;-----------------------------------------
01760 ;   @@OPEN -- Opens an existing file
01770 ;       or device
01780 ;   Aborts on all errors except changed LRL
01790 ;   #Buffer is required.
01800 ;   #LRL defaults to 0 (256)
01810 ;   #FCB defaults to current value in DE
01820 ;   AF is altered.
01830 ;-----------------------------------------
01840 @@OPEN  MACRO   #BUFFER,#LRL=0,#FCB
01850          DEFINE  @OPEN,3BH
01860          RPUSH   BC,HL
01870          LD      HL,#BUFFER
01880          LD      B,#LRL
01890          IFEQ    %%,3
01900            LD      DE,#FCB
01910          ENDIF
01920          SVC     @OPEN
01930          RPOP    HL,BC
01940          JR      Z,$1?
01950          CP      2AH     ;;Check for LRL change
01960          JR      Z,$1?
01970          LD      C,A     ;;Else error code to C
01980          LD      A,1AH   ;;@ERROR SVC number
01990          RST     28H
02000 $1?      EQU     $
02010          ENDM
02020 ;
02030 ;-----------------------------------------
02040 ;  @@POSN -- Positions file to record number
02050 ;   #REC defaults to value in BC
02060 ;   #FCB defaults to value in DE
02070 ;-----------------------------------------
02080 @@POSN  MACRO   #REC,#FCB
02090          DEFINE  @POSN,42H
02100          IFGT    %%,0
02110           IFEQ    %%,2
02120            PUSH    DE
02130            LD      DE,#FCB
02140           ENDIF
02150           PUSH    BC
02160           LD      BC,#REC
02170          ENDIF
02180          SVC     @POSN,CHECK
02190          IFGT    %%,0
02200           POP     BC
02210           IFEQ    %%,2
02220            POP     DE
02230           ENDIF
02240          ENDIF
02250          ENDM
02260 ;
02270 ;-----------------------------------------
02280 ;  @@PRT -- Send a character to the printer
02290 ;     If #CHAR not spcified, default to value in C
02300 ;-----------------------------------------
02310 @@PRT   MACRO   #CHAR
02320          DEFINE  @PRT,06H
02330          IFEQ    %%,1
02340           PUSH    BC
02350           LD      A,#CHAR
02360           LD      C,A
02370          ENDIF
02380          SVC     @PRT
02390          IFEQ    %%,1
02400           POP     BC
02410          ENDIF
02420          ENDM
02430 ;
02440 ;-----------------------------------------
02450 ;   RPOP
02460 ;      Pops 0 to 6 registers from the stack
02470 ;      Example:  RPOP    BC,DE,HL,IX
02480 ;-----------------------------------------
02490 RPOP    MACRO   #R1,#R2,#R3,#R4,#R5,#R6
02500          IFGT    %%,0
02510            POP     #R1
02520          ENDIF
02530          IFGT    %%,1
02540            POP     #R2
02550          ENDIF
02560          IFGT    %%,2
02570            POP     #R3
02580          ENDIF
02590          IFGT    %%,3
02600            POP     #R4
02610          ENDIF
02620          IFGT    %%,4
02630            POP     #R5
```

Listing 2 continued

Listing 2 continued

```
02640          ENDIF
02650          IFGT    %%,5
02660            POP     #R6
02670          ENDIF
02680          ENDM
02690 ;
02700 ;-----------------------------------------
02710 ;   RPUSH
02720 ;     Pushes 0 to 6 registers onto the stack
02730 ;     Example:  RPUSH   BC,DE,HL,IX
02740 ;-----------------------------------------
02750 RPUSH    MACRO   #R1,#R2,#R3,#R4,#R5,#R6
02760          IFGT    %%,0
02770            PUSH    #R1
02780          ENDIF
02790          IFGT    %%,1
02800            PUSH    #R2
02810          ENDIF
02820          IFGT    %%,2
02830            PUSH    #R3
02840          ENDIF
02850          IFGT    %%,3
02860            PUSH    #R4
02870          ENDIF
02880          IFGT    %%,4
02890            PUSH    #R5
02900          ENDIF
02910          IFGT    %%,5
02920            PUSH    #R6
02930          ENDIF
02940          ENDM
02950 ;
02960 ;-----------------------------------------
02970 ;  @@SOUND --  Scund through built-in speaker
02980 ;    If #tone & #dur are not specified, values
02990 ;    default to current contents of B
03000 ;-----------------------------------------
03010 @@SOUND MACRO   #TONE,#DUR
03020          DEFINE  @SOUND,68H
03030          IFGT    %%,0
03040            PUSH    BC
03050            LD      B,#DUR<3+#TONE
03060          ENDIF
03070          SVC     @SOUND
03080          IFGT    %%,0
03090            POP     BC
03100          ENDIF
03110          ENDM
03120 ;
03130 ;-----------------------------------------
03140 ;     Invoke a TRSDOS 6 SVC
03150 ;     If "check" is specified, exit
03160 ;     through @ERROR if NZ flag is returned
03170 ;     from TRSDOS.
03180 ;-----------------------------------------
03190 SVC      MACRO   #NUM,#CHECK
03200          LD      A,#NUM          ;;A = SVC number
03210          RST     28H             ;;Perform SVC
03220          IFGT    %%,1            ;;More than one arg.?
03230            JR      2,$1?         ;;Go if no error
03240            LD      C,A           ;;Put error code in C
03250            LD      A,1AH         ;;@ERROR SVC number
03260            RST     28H           ;;Exit through @ERROR
03270 $1?        EQU     $             ;;Here if no error
03280          ENDIF
03290          ENDM
03300 ;
03310 ;-----------------------------------------
03320 ;  @@WRITE -- Write a record to a file.
03330 ;    #UREC defaults to value in HL
03335 ;    (unused if LRL = 256)
03340 ;    #FCB  defaults to value in DE
03350 ;-----------------------------------------
03360 @@WRITE MACRO   #UREC,#FCB
03370          DEFINE  @WRITE,4BH
03380          IFGT    %%,0
03390            IFEQ    %%,2
03400              PUSH    DE
03410              LD      DE,#FCB
03420            ENDIF
03430            PUSH    HL
03440            LD      HL,#UREC
03450          ENDIF
03460          SVC     @WRITE,CHECK
03470          IFGT    %%,0
03480            POP     HL
03490            IFEQ    %%,2
03500              POP     DE
03510            ENDIF
03520          ENDIF
03530          ENDM
03540 ;
```

End

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A-Draw gives you reduction and enlargement, plus magnification.

Continued from p. 43

velop new drivers and add them to future releases. It took them two attempts to provide an adequate driver for my DMP 200 and a third to perfect it. They couldn't give me italics, which the printer doesn't support, but gave me the complete set of foreign and technical characters by graphically creating the ones my printer didn't have. The service is free.

A-Draw

A-Draw is as good as any stand-alone paint program I've used. You have freehand drawing with a complete kit of brushes, along with functions for adding, positioning, and sizing lines and basic shapes. You can paint by spraying or by filling with a variety of preset patterns or ones you design. Although the program doesn't support color printing, you work with two four-color palettes on the screen. A-Draw gives you magnification for detail work and reduction and enlargement.

Cut-and-paste operations let you remove, copy, flip, turn, or reposition parts of your drawing. You can also save parts of it, as well as bring previously saved drawings into the one you're working on. A-Plus comes with a library of 100 drawings to get you started.

A Text function lets you create headlines. Each of the seven fonts supplied with the program comes in five styles, including shadow and outline, and you can combine styles to produce more. The font sizes are preset, but once you have the text on the screen, you can reduce or enlarge it.

At present, A-Draw does not support an external input device such as a joystick, pad, or mouse.

A-Plus keeps its own internal directories. If you go looking through an A-Plus work disk on the DOS level, you won't find the file you called "Letter to Aunt Mae" with the DIR command, nor much else you'd recognize. On the other hand, with 20 characters allowed within the program to name directories and documents, you have room for meaningful labels.

Graphically, A-Plus represents your subdirectories as loose-leaf binders and your individual documents as divisions inside them. You select a binder from a stack of them on the right side of the screen, and an open binder on the left shows you the files it contains. Your binders and files are always available to you as menus, and it's easy to page through them to find what you need.

File-management utilities make using DOS for housekeeping practically unnecessary. Without leaving A-Plus, you can copy, move, rename, and delete files singly or in batches. You can copy and move files between binders on the same disk or from disk to disk. Because A-Plus automatically maintains an archive copy of each file, it's difficult to kill a file accidentally. To completely trash one, you must remove the second copy separately. Another utility lets you import and export text in ASCII format. Finally, you have utilities for formatting new work disks and for making complete disk backups.

Tandy Trouble

A-Plus does not support the Model 1000 keyboard. You won't be able to use your arrow keys, and you'll have to get used to using your numeric keypad for cursor movement only. Keys like home and insert are inoperable and become the 7 and zero keys, respectively. And you won't be able to type four characters at all, most seriously the backslash. Model 1200 and 3000 keyboards operate normally. (According to Savtek, the next upgrade will accommodate the Model 1000.)

Tandy printers, because of the way they handle line feeds, present a problem printing text and graphics together. With some of them, like my DMP 200, you can solve the problem by setting a DIP switch or a software switch. With others, the only solution will be to use a non-Tandy cable or modify a Tandy cable by cutting the wire to pin 14. Also, if you configure your system with the Mode LFOFF command, you'll have to turn DOS's line feeds back on before using A-Plus.

Conclusion

If I were looking at this product from the point of view of a professional writer's tool, I'd have reported several shortcomings. For instance, I'd complain about the way the program handles paragraph formatting, particularly double-spacing, or the lack of command macros. Within the context for which A-Plus is intended, however, I found little to fault: For the moment, the only illustrations you can use in A-Write are those created by A-Draw. If this is a failure, it's a small one.

A-Plus ETG is a fine piece of work, beautifully conceived and impressively executed. More than that, this package is a lot of fun to use. I suppose that could be dangerous.■

More Interference Than Interface

★

Autodos 2.0 runs on the Model 1000/1200/3000 (128K) and requires one disk drive. The Software Company, P.O. Box 872687, Wasilla, AK 99687. 907-745-6267. $34.95.

Autodos is a minimal shell that lets you issue DOS commands and start programs by menu selection. The memory-resident program maintains control of the operating environment so that when you complete a command or exit from a program, its menu screen returns in place of the DOS prompt. The screen displays the current drive and directory as well as the date and time.

The DOS menu lists system commands and utilities and prompts you for parameters when they are needed. The Run menu shows only the EXE, COM, and BAT files in the current directory. You select a command or program by entering a number.

If only it were so pat. The installation procedure is the crankiest I've ever used. It took three attempts to get the program properly installed. If that wasn't indication enough of trouble, the program didn't clear the screen on startup but laid its menu screen over what was already there.

The DOS menu's value is limited. It makes sense that, to execute an external command such as Diskcopy, Diskcopy.COM must be available. It seems to make sense that Autodos has to load Command.COM to process many internal commands. It makes sense until you discover that you can't look at a directory unless Command.COM is in the system path. On a floppy-disk system, that translates into slower operation and a lot of disk shuffling.

The DOS menu's shortcomings go deeper. Take the familiar example of a DIR command: From Autodos, you type a number and press enter. Then, in response to a prompt, you type the path name and switches, just as you would from the system prompt, and press enter again. Nothing in the Autodos prompt saves you from looking in the DOS manual if you don't know the command's syntax. (In fact, with other commands the prompts confused more than they illuminated.) And simple arithmetic shows a net savings of exactly one keystroke with Autodos. I wasn't impressed.

The Run menu is a bit more useful. If you can't remember where you've put a program or its exact spelling, you can browse through directories. Since the Autodos menu shows you only the executable files, the searching should be easier. Unfortunately, to change drives

and directories you first have to go to the DOS menu and use CHDIR, a clumsy way to go. Also, if a floppy disk does not contain system files (i.e., if you didn't format it with the /S switch), one program will not show up in the menu. With several of my disks, the ignored program was the primary program, rendering the disks unusable under Autodos.

The documentation does warn of this shortcoming. It also warns you not to run Basic or BasicA from Autodos, which puts all your Basic programs out of reach.

Autodos provides two other utilities. One reads a key or key combination you press and returns the ASCII codes and characters generated. The other displays the computer's character set.

On the face of it, Autodos's simple-shell concept seemed a good and useful idea. After I worked with it for a while, it proved anything but a convenience. The Software Company claims that version 2.1, the third revision I received in a six-week period, eliminates some of the problems I discussed. I was unable to install version 2.1.

—Harry Bee

Scrolling Nowhere

★

Omniscroll III/IV runs on the Models III/4 and requires one disk drive and either TRSDOS 1.3 or Newdos/80 2.0. Lyons Products, P.O. Box 272, Titusville, PA 16354, 814-827-9892. $19.95.

If you happen to get the product-description flyer with Omniscroll III/IV, you find that it is a screen-scrolling utility for the Model III, or 4. However, Omniscroll III/IV's printed documentation says more about licensing problems than what the program does. The documentation does not even include the vendor's full address.

Moreover, Omniscroll's text files describe the program only as running on the Model III. I infer from the references to Model I TRSDOS and Newdos that the program also runs on the Model I. Since the disk is in Model III format, I don't know how the average user gets Omniscroll to a Model I disk. The on-disk documentation also makes no reference to Model 4 DOSes, so I don't see how it will run in the Model 4 mode.

The flyer claims that Omniscroll is good for animated graphics from interpred Basic, and that it can serve as a foundation for windowing programs. Since the on-disk documentation does not address it, I fail to see how the program can help you with animated graphics unless you already have expertise in that area.

Omniscroll comprises two demonstration programs containing routines for selective scrolling. You can modify the routines and add them to your Basic programs. The routines scroll text up or down, right or left, and even diagonally within a selected window area created by your Basic program.

You scroll by setting Basic variables to certain values and calling a USR function to a machine-language subroutine, which your Basic program pokes into memory. Each USR-function call shifts the windowed area one space right, left, up, or down, so you do all scrolling by programming a For. . .Next loop for multiple calls of the subroutine.

Omniscroll also provides five flowchart text files, a documentation file, an assembly listing in text form, and two programs to print out the documentation or display it on your screen. To understand the flowcharts, you must imagine what they would look like compared to five flowchart patterns (without words) printed on the reverse side of the one-page printed documentation.

Omniscroll is strictly a hacker's program, requiring much analysis of the demos. The program's author does not follow good practices for developing reusable program modules; i.e., you cannot simply merge the routines for use in your programs. The routines do not use unique variable names, and they are numbered 220–1210 for one demonstration program and 60–1210 for the other.

The documentation tells you what the demos do and doesn't give you good programming information. You must dissect the demos for this. The author uses most of the documentation to describe his machine-language listing.

Omniscroll is an unprofessional product. Printing your own documentation is acceptable only if the program is freeware or in the public domain. The Basic program that prints the documentation does not paginate or include a left margin; two more lines of Basic code would do this.

Omniscroll would better serve as a magazine article describing a programming technique. But for sale? Never.

—Thomas L. Quindry

Beginner's Gothic

★★

Moonmist runs on the Tandy 1000/1200/3000 (128K) and requires one disk drive. Infocom inc., 125 Cambridge Park Drive, Cambridge, MA 02140. 617-576-3190. $39.95.

A letter from your old friend, Tamara Lynd, is a pleasant surprise in your otherwise harried life. After all, being an attractive, celebrated, brilliant, young detective is demanding. So you smile, perhaps with a touch of envy, as you learn how Tamara's trip to Europe has turned suddenly into a storybook romance. "You'll never believe what's happened!" she writes. "I'm living in a castle in Cornwall, engaged to marry a British Lord!"

Her words bubble from the page as she tells you of the ancient castle, complete with its ghost and buried treasure; of her fiance, Lord Jack Tresyllian; and of all the other stuffy, charming, scheming, sinister characters who populate her new life.

Lord Jack himself is no gadabout, she assures you, nor is the life of a British peer carefree. For one thing, Jack's former girlfriend drowned in the castle well soon after he broke off the romance because of her affair with his best friend. Her body was never found. And Jack inherited more than a castle and a title from Uncle Lionel. The family's debts forced Lord Jack to open the castle to the public to keep what remained of the family heirlooms from the likes of a too eager London antiques dealer.

Tamara's second letter, however, is another story. "Help!" she begins. Someone, it seems, is trying to kill her.

Moonmist has all the elements of a classic Gothic mystery fit for a Holmes or a Whimsey. If you've never tried interactive fiction, if you've been looking for a text adventure to begin with, Moonmist's Tresyllian Castle might be the place to start. The objectives are clear, the puzzles are well-defined, and none of them require the often frustrating and defeating leaps of logic for which adventure games are notorious.

However, gamers with any experience will be disappointed. Moonmist is too easy. Its setup—the set piece at the beginning that leads you by hand to the first hints and clues—goes too far. By the time the program leaves you on your own, the promising mystery has been reduced to the level of a pulp romance.

Moonmist offers four scenarios based on the same characters, plot, and setting. Each begins with the same opening sequence, varied only by the specific clues you are given. Each ends with a different villain, treasure, and rationale.

In theory, that's not a bad idea. In practice, because the four stories share not only the same premise but also the same map, props, and devices, it doesn't work. Once you've solved the first story, about all that's left for the other three is the drudgery of searching the same territory for only slightly different quarry. And nowhere is there the least hint that your character is in any danger.

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for which Infocom games are famous, is not enough by itself to invent excitement and sustain interest. Moonmist is a passable demonstration of the techniques and possibilities of text adventures, but no more than that.

—Harry Bee

Up the Corporate Ladder

★★★★☆

Managing for Success (formerly American Dream) runs on the Tandy 1000/1200/3000 (256K) and requires one disk drive. Blue Chip Software Inc., 6744 Eton Ave., Canoga Park, CA 91303, 818-346-0730. $59.95.

Managing for Success is a corporate-management simulation that you can play for amusement or training. It comes on two disks with a softcover manual. The program is copy-protected; you must use disk A to start the game even if you've moved the program to a hard drive. Replacement copies are free for 90 days, $22.50 thereafter.

Whether or not Managing for Success has educational merit, it is fun to play. It places you in a top management role in an initially profitable robot-manufacturing company. You control seven areas: engineering, material control, quality control, finance, production, marketing, and research. The program advises you of the state of the economy as play progresses: it tracks changes in GNP, inflation, hourly wages, and prime interest rate. Each simulation lasts six years, incrementing one month at a time. You can save a game in progress.

To help you make decisions about the business, you receive detailed reports from the various divisions. Such items as product-cost analysis, labor use, shipment forecasts, and income statements are available on demand and appear automatically every quarter. Memos also appear occasionally, reporting on progress in certain areas or warning about dangerous trends.

Managing for Success also has a capable graph-generating module that lets you custom-design graphs of any two items you choose. For convenience, certain graphs are available predesigned from the major departments.

The program's main screen displays the most important financial information, such as the revenue for the month, profit, units shipped, and projected cash balance. The only other item I wish this screen had is the previous month's data for comparison.

Various factors are within your control. In some departments (research and development, quality control, engineering), you can only increase or decrease the budget. In others, you have more choices. In the finance department you can discount receivables to prompt those who owe you money to pay more promptly. You can also change the number of days you take to pay your creditors. In marketing, you can go from commissioned reps to salaried salesmen, increase advertising, run special promotions, or hire a market-research firm.

As you make changes, it can be difficult to make a profit on each unit because there is little margin on the robots and the competition's price forces you to remain at a reasonable level. Even gentle tinkering can catapult you into the red in a short time. As in the real world, sometimes it is hard to understand how to correct problems.

Many factors affect sales: the uniqueness of the product, quality, customer satisfaction, price, and promotion. It's a challenge to balance these factors. One nice feature is the worksheet section, which lets you test changes you are considering before you take any action.

I was confused by a discrepancy between the figure given as the break-even price of the robots in the marketing section and the unit cost of the robots as listed in the reports section. The logical conclusion would be that these figures should be the same. But one month I lost money with each sale (selling at less than my unit cost), yet the break-even price shown was below my selling price, indicating that I should have made money.

I found no explanation for this in the manual, but a call to the company's support line resulted in the answer. The break-even price is based on sales projections for the coming month, whereas the unit cost is based on actual sales for the previous month.

You can change many factors, from the name of the company to the initial bank-account balance, in Managing for Success from an auxiliary program. This feature keeps the simulation interesting after repeated plays.

The manual enhanced the educational aspect of the program. It is a complete introduction to the manufacturing business. The manual explains all terms found in the simulation, suggests strategies, analyzes each department's function, and emphasizes pitfalls. It is clearly written and designed.

The fun of Managing for Success is its complexity and the intertwining of all the factors causing the corporation's success or failure. Whether learning to master the game will also help in the real world is unknown, but it certainly helps you acquire perspective and insight into the complexities of the corporate envtronment.

—Wynne Keller

MS-DOS

Student Lotus

In a joint marketing agreement with the Lotus Development Corp., Addison-Wesley Publishing Co. has introduced the 1-2-3 Student Edition, a fully functional version of 1-2-3 customized for instructional applications. The package includes teacher and student manuals that provide lab exercises for college courses.

The software includes all the features and functions of the professional version, except that the Student Edition is limited to a 64-column by 84-row spreadsheet, while the full 1-2-3 has 256 columns and 8,192 rows.

The suggested retail price for the 1-2-3 Student Edition is $49.95. Contact Addison-Wesley Publishing Co., Reading, MA 01867, 617-944-3700.

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The 1-2-3 Student Edition has many features of its big brother.

Full Text and Graphics Layouts

Ingram Software Inc. is distributing White Science's desktop publishing package, Pagebuilder. Besides its text-handling abilities, the program offers advanced graphics abilities, including complete line drawings, charts, and graphs.

Pagebuilder can read data-interchange format (DIF) files from Lotus or other spreadsheet programs, data-exchange format (DXF) files from Autocad and other CAD programs, and ASCII text files from popular word-processing programs. It supports kerning and justification.

The program supports fully proportional fonts ranging from 3–72 points and can work with Canon- and Ricoh-engine laser printers; Calcomp, Kurta, and Summagraphics digitizing tablets; PC and Microsoft Mouse; and scanner input devices.

Pagebuilder sells for $495 from Ingram Software Inc., 2128 Elmwood Ave., Buffalo, NY 14207, 800-828-7250 (east), 800-847-6383 (west).

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Automate Your Business

Automate is an order-entry and billing software package that updates inventory and records sales, costs, margins, and markups.

When you make a sale, you type in the number sold and the stock number. The program checks the inventory and enters an item description, the price, tax, and the line and invoice totals. You can also enter payments on account, payments to vendors, and charges for merchandise, labor, or services. Once you've typed in the information, Automate writes the invoice, records the sale, and updates the inventory.

The program sorts the charge-invoice file chronologically and writes the entries to customer files. You then call up each file and make any necessary changes, and Automate writes and addresses individual customer statements.

Automate sells for $149.95 and requires an MS-DOS machine with a color-graphics adaptor, 256K, and two disk drives. Contact RHM & Associates, 913 Helen St., Midland, MI 48640, 517-631-9334.

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Welcome Aboard, Captain Kirk

You are Captain James T. Kirk, of the starship Enterprise. While exploring an unmapped sector of space near the Great Transtellar Rift, the Enterprise comes under sudden attack. Your entire stock of raw protein substance (the base material of synthesized foods) is damaged, and you've got to beam down to the nearest class M (oxygen-nitrogen atmosphere) planet to find food before your crew starves.

Thus begins Simon & Schuster Software's newest interactive fiction adventure. It's called The Promethean Prophecy, and it sells for $39.95 from Simon & Schuster Software, One Gulf + Western Plaza, New York, NY 10023, 212-373-8882.

Circle 553 on Reader Service card.

Financial Help From J.K. Lasser

J.K. Lasser's *Your Income Tax* is a book and software package with 27 forms and schedules updated to meet the revisions in the income-tax laws. On-screen help information and references to paragraphs in Lasser's book should answer your questions.

By asking specific questions, the program determines which forms and schedules apply to your tax situation. Then it walks you through each step of the filing process. The screen displays a form 1040.

You can call up a calculator as you work or move back and forth between 1040 line numbers and related forms and schedules. The program automatically transfers your calculations to your 1040.

When you've finished, *Your Income Tax* computes your return and prints it directly onto your 1040. (It can print 27 other forms and schedules also.)

Your Income Tax sells for $69.95 and requires 128K, a disk drive, and DOS 2.0 or higher. If you bought the program last year and still have proof of purchase, you can get the update for $29.95.

J.K. Lasser's Your Money Manager is a home-accounting and small-business tool that helps organize and maintain financial records. It includes a check writer, financial statements, balance sheets, and budget reports.

The program features an on-screen; four-function cal-

How to Use *80 Micro* Program Listings

Basic program listings in *80 Micro* include a checksum value at the end of each line. This value is the sum of the ASCII values of all characters and spaces in the line, excluding remarks. You can use these values to test the accuracy of your typing.

- Type in program code *exactly* as listed, omitting the indentations (when program lines continue to a second or third magazine line). The '* characters, checksum values, and comments may be omitted.
- Save the program in ASCII format with the command SAVE "file name",A.
- Load and run Checksum (see Program Listing). (For the Tandy 1000, change line 10 to: 10 CLS:LOCATE 2,25:PRINT "VERIFY CHECKSUMS ON PROGRAM" '* 3544.) The program will prompt you for the name of the file to be verified and give you the option of sending the line numbers and checksum values to the printer or to the screen.

When printing to the screen, Checksum lists 20 lines and then waits for you to press the enter key.

- Compare the displayed line numbers and checksum values with the checksums shown in the listing. Correct errors in lines having checksum values that don't match.

—Beverly Woodbury,
Technical Editor

Program Listing. Checksum.

```
10 CLEAR 1000:CLS:PRINT@140,"VERIFY CHECKSUMS ON PROGRAM"          '*  3713
20 PRINT:PRINT:INPUT "Enter Name of File to verify";F$             '*  4245
30 PRINT:PRINT:PRINT "List Checksums to:"                          '*  3233
40 PRINT TAB(20) "<P>rinter":PRINT TAB(20) "<S>creen"              '*  3628
50 PRINT:PRINT:PRINT TAB(30);"? ";                                 '*  2148
60 K$=INKEY$                                                       '*   726
70 IF K$="P" OR K$="p" OR K$="S" OR K$="s" THEN 80 ELSE 60         '*  3269
80 PRINT K$:IF K$="P" OR K$="p" THEN LP=1                          '*  2439
90 OPEN "I",1,F$:B$=CHR$(34)                                       '*  1521
100 IF EOF(1) THEN CLOSE:GOTO 390                                  '*  2000
110 LINE INPUT#1,L$:L=VAL(LEFT$(L$,6))                             '*  2275
120 IF Z=2 AND L=0 THEN 100 ELSE Z=2                               '*  2089
130 A=VARPTR(L$):GOSUB 270:Q=PEEK(A)                               '*  2244
140 LS=PEEK(A+1):MS=PEEK(A+2):A=MS*256+LS:GOSUB 270                '*  3115
150 IF INSTR(L$,"'") THEN GOSUB 280                                '*  2038
160 IF RIGHT$(L$,1)=" " THEN IQ=Q:GOSUB 370                        '*  2514
170 FOR K=1 TO Q:P=PEEK(A):CS=CS+P:A=A+1:NEXT K                    '*  2945
180 IF CS=0 THEN 100                                               '*  1131
190 IF CS<100000! THEN D$="-"                                      '*  1538
200 IF CS<10000 THEN D$="- "                                       '*  1481
210 IF CS<1000 THEN D$="-  "                                       '*  1466
220 IF CS<100 THEN D$="-   "                                       '*  1451
230 IF LP=1 THEN LPRINT "Line";L;D$;CS,:CS=0:GOTO 100              '*  3370
240 PRINT "Line";L;D$;CS:CS=0:X=X+1                                '*  2282
250 IF X=20 THEN X=0:PRINT TAB(30) "Press <ENTER> to continue."
    ELSE 100                                                       '*  4924
260 K$=INKEY$:IF K$<>CHR$(13) THEN 260 ELSE 100                    '*  2705
270 IF A>32767 THEN A=(65536!-A)*-1:RETURN:ELSE RETURN             '*  3275
280 I=INSTR(L$,"'"):IQ=I-1                                         '*  1504
290 IF LEN(L$)=INSTR(L$,"'") THEN 100                              '*  2095
300 LQ$=STR$(L):LQ=LEN(LQ$):IF LQ+2=>I THEN 100                    '*  2839
310 Q1=INSTR(L$,B$):IF Q1>I OR Q1=0 THEN 370                       '*  2593
320 Q2=INSTR(Q1+1,L$,B$):IF Q2>I THEN I=INSTR(Q2,L$,"'")           '*  3297
330 IF I=0 THEN RETURN                                             '*  1386
340 Q3=INSTR(Q2+1,L$,B$):IF Q3>I OR Q3=0 THEN 370                  '*  2869
350 Q4=INSTR(Q3+1,L$,B$):IF Q4>I THEN I=INSTR(Q4,L$,"'")           '*  3308
360 IF I=0 THEN RETURN                                             '*  1389
370 FOR I=IQ TO 1 STEP-1:C=ASC(MID$(L$,I,1)):IF C<33 THEN NEXT I   '*  3847
380 RL$=LEFT$(L$,I):Q=LEN(RL$):RETURN                              '*  2323
390 PRINT:PRINT"CHECKSUM/BAS now in Memory"                        '*  3248
400 PRINT "Reload the PROGRAM that you are working on? (Y/N)";     '*  4890
410 INPUT Q$:IF Q$="Y" OR Q$="y" THEN CLS:LOAD F$                  '*  2967
```

End

80 MICRO'S LIST of ADVERTISERS

MAY 1987

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1. ☐ I own an MS-DOS, IBM compatible system.
2. ☐ I intend to purchase.
3. ☐ I'm interested but have no immediate plans to purchase.
4. ☐ Not interested.

B. On a scale of 1 (no interest) to 5 (great interest), please rate your interest in seeing the following types of programs published in 80 Micro:
___ 1. Business applications
___ 2. Science/math applications
___ 3. Home management applications
___ 4. Money management applications
___ 5. Games
___ 6. Programming Utilities

C. *Excluding yourself*, how many people read your copy of 80 Micro?
1. ☐ One
2. ☐ Two
3. ☐ Three
4. ☐ Four
5. ☐ Five or more

D. What type of TRS-80/Tandy Computer do you own? Check all that apply.
1. ☐ Model I
2. ☐ Model II/12
3. ☐ Model III
4. ☐ Model 4/4P/4D
5. ☐ Model 4D
6. ☐ Model 16/16B/6000
7. ☐ Model 100/200
8. ☐ Model 600
9. ☐ Model 1000
10. ☐ Model 1200
11. ☐ Model 2000
12. ☐ Model 3000

E. How long have you owned your TRS-80/Tandy Computer?
1. ☐ Less than 1 year
2. ☐ 1-2 years
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4. ☐ 3-4 years
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F. Do you subscribe to an information utility, such as Compuserve, Dow Jones News Retrieval, etc.?
1. ☐ Yes
2. ☐ No
3. ☐ Not now, but intend to within 12 months.

G. Do you plan to purchase another TRS-80/Tandy Computer during the next 12 months?
1. ☐ Yes
2. ☐ No
3. ☐ Don't know

H. Where do you use your TRS-80/Tandy Computer? Check all that apply.
1. ☐ At home for pleasure
2. ☐ At home for business
3. ☐ At work
4. ☐ At school
5. ☐ For math/science applications in any location

I. The articles in 80 Micro are:
1. ☐ Too simple
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J. How many purchases have you made based on an ad you saw in 80 Micro?
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K. Which of the following columns do you read? Please rate them on a scale of 1 (seldom read) to 5 (always read).
___ 1. Side Tracks
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___ 3. Pulse Train
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___ 5. The Next Step
___ 6. Dave's MS-DOS Column
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___ 8. Reader Forum
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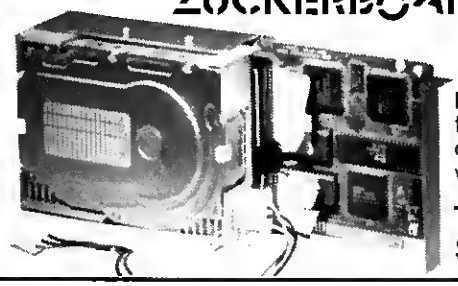

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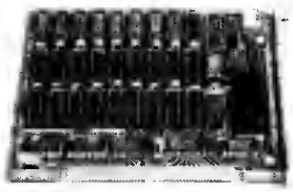

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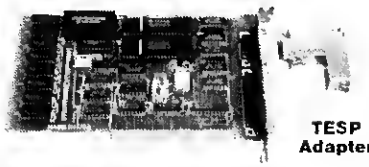

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Statistical Forecasting

Walonick Associates has released a forecasting module that adds exploratory data analysis, time-series forecasting, and quality-control analysis to Statpac Gold, the company's statistical-analysis software.

The module provides graphics for time plots, 4253HT robust-smoothed time plots, box plots, aggregate box plots, spread-versus-level plots, and autocorrelation function plots. The Statpac Gold package contains three regression-modeling techniques. The module adds 11 forecasting methods: seven smoothing techniques, two methods of decomposition, and two ARIMA techniques.

The smoothing techniques include moving averages, exponential smoothing, harmonic smoothing, and the Holt's and Winter's methods. The module also provides Census X-11 and SABL (robust) decomposition methods for long-term seasonal forecasting, adaptive-filtering, and Box-Jenkins ARIMA programs.

Statpac Gold sells for $595. Add $195 for the forecasting module. Contact Walonick Associates, 6500 Nicollet Ave. South, Minneapolis, MN 55423, 800-328-4907.

Circle 558 on Reader Service card.

Hiring Software

The Logical Decision Assistant helps employment interviewers select the most qualified applicant by focusing attention on the five most critical elements of a position and comparing applicants to those elements. You choose the elements, which can include such qualities as education, communication skills, accuracy, and experience.

The program requires 256K and sells for $395. A demonstration disk sells for $25. Contact Young Associates, 15720 Winchester Blvd., Los Gatos, CA 95030, 408-395-6441.

Circle 559 on Reader Service card.

Hard-Disk Security

Version 4.0 of the Onguard system operates as an extension of DOS, regulating each user's access to a MS- or PC-DOS hard drive. Onguard gives one person control over who uses the hard disk and what data and programs each user can access. It also provides a comprehensive audit trail, allowing the system manager to monitor hard-disk use.

Onguard 4.0 features revised documentation, drive A boot protection, the Privacy Plus encryption program, and the Master Key encryption-key recovery program.

Privacy Plus lets you encrypt your files and directories. Using English commands or full-screen pop-up menus, you can lock and unlock your data. Master Key lets the system manager decrypt encrypted data without disclosing the Master Key.

Onguard sells for $295 from United Software Security Inc., 8133 Leesburg Pike, Vienna, VA 703-556-0007.

Circle 557 on Reader Service card.

Program-Development Screens

High Screen 3.4 is an enhanced program-development tool you can use with all programming languages. Its features include sophisticated screen generation; automatic field checking; and help, window, and pull-down menu management.

You can choose a field-by-field or full-screen mode for each data-entry screen, scroll vertically within a zone, and call High Screen functions from batch files or DOS.

High Screen does not generate code; it creates language- and program-independent screens and uses a resident module to interface these screens with the applications you've developed. Therefore, you can change screens without modifying the program, and you can use the same screen developed while writing an application in one language to rewrite the program in another.

High Screen 3.4 is royalty free and not copy-protected. It sells for $129, and registered owners of earlier High Screen versions can upgrade for $20.

The High Screen Unloader uses a hierarchical structure to let you selectively unload resident programs from RAM. It's available for $20 to High Screen users.

Contact Softway Inc., 500 Sutter St., Suite 222, San Francisco, CA 94102, 415-397-4666.

Circle 555 on Reader Service card.

The Mouse Base provides a non-skid surface on which to use your mouse.

Etc.

Mouse Base

Mouse Base is a durable nylon and sponge-rubber non-skid mouse pad that improves tracking and protects the mouse and the desk. It measures 11¾ by 8½ inches and sells for $9.95 from Computer Coverup Inc., 2230 South Calumet, Chicago, IL 60616, 312-326-3000.

Circle 563 on Reader Service card.

PC Law

Lawlink is the American Bar Association's law-office software program that integrates several legal programs into a single-menu system. It also includes a communications package.

Lawlink lets lawyers create a series of customized menus and then switch between

such programs as a word processor and a data base. The communications element provides access to ABA/net and legal data-base services.

ABA members can buy Lawlink for $60. It's $120 for non-members. Contact the Law Office of the Future Project, American Bar Association, 750 North Lake Shore Drive, Chicago, IL 60611, 312-988-5026.

Circle 560 on Reader Service card.

Star Gazing

Skyshot is a program that determines ground azimuths from observations of celestial objects. You plug in your measurements (from up to eight observations) and ephemeris values, and the program calculates the azimuth bearing.

Skyshot lets you choose any of three celestial observations methods: direct-altitude observation, hour-angle observation of sun, or polaris observations. The program works independently or as an accessory to MTI Software's Series 800, Series 2000, or Series 3000 survey packages.

MS-DOS and CP/M versions of Skyshot sell for $125 from MTI Software, P.O. Box 1659, 600 B St., Santa Rosa, CA 95402, 707-523-1600.

Circle 567 on Reader Service card.

A wrist strap to prevent static charges.

Get a Charge Out of This

Scooter Products' Anti-Static Wrist Strap is an elastic fabric wrist band that you wear while working with sensitive chips and circuits to prevent static charges from affecting them.

The strap has a conductive inside surface connected to a 1-megohm resistor (for the wearer's protection) that, in turn, connects to a 10-foot, telephone-type coiled cord. A banana plug at the other end of the cord inserts into an alligator clip that you attach to a conductive work surface.

The Anti-Static Wrist Strap comes in small (Model SS801-S) and large (Model SS801-L) and sells for $14.95 from Scooter Products, Ohm/Electronics Inc., 746 Vermont St., Palatine, IL 60067, 800-323-2727 (in IL, 312-359-6040).

Circle 571 on Reader Service card.

Spike Out

The model MPS(22)-2 Portable Computer Protection System insulates your portable computer from ac and modem line spikes, electrical noise, RFI, and static. The unit provides standard and CEE-22 electrical sockets, a standard phone RJ-11 modular socket/plug, and a static-discharge plate.

The MPS(22)-2 sells for $185 from Electronic Specialists Inc., 171 South Main St., Natick, MA 01760 800-225-4876.

Circle 564 on Reader Service card.

232 × 2

The Black Box 232 Line Booster receives and retransmits the 12 most commonly used signals of the RS-232C interface. This doubles the RS-232's specified 50-foot signal-transmission distance. The device is data-rate and data-format transparent, and you can power it from the interface or a detachable power supply.

The Centronics Line Booster does all that the Black Box does, and it accommodates the Centronics-compatible printer interface. It supports the interface's 16 most common signal lines and lets you

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Reader Service

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double the cable length to 10–15 feet.

Either device sells for $99, and you install it in the center of the RS-232 or Centronics cable. Contact Black Box Corp., P.O. Box 12800, Pittsburgh, PA 15241, 412-746-5500.

Circle 562 Reader Service card.

Line Backers

The Networx Power Backers 330 and 450 provide uninterruptible power to protect computer data and memory against blackouts and power sags. They also contain fast-response circuitry that guards against surges, spikes, and radio-frequency and electro-magnetic interference. During a power failure, the Model 330 can restore power within 2 milliseconds, and the Model 450 can do so within 4 milliseconds.

Depending on how a system is configured, the Power Backers can maintain power for up to 30 minutes, giving you enough time to shut down your system. The Power Backer sounds an alarm 2 seconds before its battery is exhausted.

Networx's Power Backers provide uninterruptible power.

The Model 330 provides a peak-output current of 6 amps and sells for $499. The Model 450 provides a 9-amp peak-output current and sells for $799. Contact Networx, 203 Harrison Place, Brooklyn, NY 11237, 718-821-7555.

Circle 569 on Reader Service card.

Micro Disks

Maxell's MF2-HD high-density 3½-inch, micro-floppy disk features 2-megabyte (MB) unformatted or 1.6MB formatted capacity. The disks use a thin coating of high-coercivity epitaxial magnetic material and are housed in a precision cartridge to reduce output fluctuation. They are software compatible with 1MB, 5¼-inch disks and 1.6MB, 5¼-inch and 8-inch disks.

A box of 10 MF2-HD disks sells for $69.95. For more information contact Maxell Corp. of America, 60 Oxford Drive, Moonachie, NJ 07074, 201-641-8600.

Circle 566 on Reader Service card.

Bus Terminal

Bizcomp's external Intellimodem 2400 and its internal Intellimodem 2400 PC are fully Hayes-compatible, 2,400-baud modems that include a bus so you can plug in future modifications. Both modems are also compatible with Bell 103/212/V.bis specifications and support 1,200 and 110–300 baud communications. They include audible call-progress monitoring with adjustable volume controls and loop-through RJ-11 connectors for connecting telephone sets.

These modems also feature

Circle 152 on Reader Service card.

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PRINTER — MAKE, MODEL NUMBER. Contact us if your printer is not listed. We have many more in stock. We can probably RELOAD your old cartridges.	RIBBON SIZE Inches by Yards	NEW CARTRIDGES — From the various manufacturers or made in our own shop. Ready to use.			RELOADS — You SEND your used CARTRIDGES to us. WE put OUR NEW INSERTS in them.			INSERTS EZ-LOAD™ — DROP IN, NO WINDING! EXACT REPLACEMENTS made in our own shop. Cartridges NOT included.		
C ITOH Prowriter 1550-8510, NEC 8023-8025, APPLE OMP-IMAGEW	1/2 x 18	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
IBM PROPRINTER (Standard Paper) (4201)	7/16 x 20	$16/2	$51/8	$ 96/12	$8/1	$7 ea	2 or more	$16/3	$86/12	$360/72
PC (Standard Paper) (5162)	1/2 x 20	$14/2	$38/8	$ 86/12	$7/1	$8 ea	2 or more	$15/3	$54/12	$286/72
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH		RS LP-I-II-IV, CENTRON			730-737-739-778 (Zip Pack)			$12/3	$45/12	$252/72
Carbon Film - OWP 210, DIABLO HYTYPE II Black (1445)	5/16 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
OW II, OWP 410-510, RICOH 1200-1300-1600 Black (1419)	1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
Red, Green, Blue, Brown Colors (1418)	1/4 x 130	$21/3	$72/12	$414/72	$6 ea 3-11	$5 ea	12 or more	$30/6	$54/12	$234/72
Fabric (Long Life), OWP 210, DIABLO HYTYPE II Black (1458)	5/16 x 17 NOT EZ LOAD 1/4 x 25	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
OW II, OWP 410-510, RICOH 1200-1300-1600 Black (1449)		$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
OMP-100, LP VII, COMMODORE 1525, GORILLA BANANA (1424)	Inker Loop	$18/2	$51/6	$ 96/12	.....			.....		
OMP-200, 120, (430 Inserts & Reloads Only) (1296) (1483)	1/2 x 20	$20/2	$57/6	$108/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
OMP-400-420, LP VI-VIII, PANASONIC KXP-130-1093 (1418)	5/16 x 14	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
OMP-500 (130 Inserts & Reloads Only) (1236) (1482)	1/2 x 20	$22/2	$63/6	$120/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
OMP-2100, TOSHIBA P1340-1350-1351-351 (1442)	1/2 x 20	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
OMP-2200, C ITOH 3500 (1233)	1/2 x 52		$35 each		$18/1	$18 ea	2 or more	$30/3	$57/6	$108/12
LP III-V, CANON A 1200 (New Only) (1414)	1/2 x 15	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
EPSON LQ 1000	1/2 x 18	$22/2	$63/6	$120/12	$6/1	$7 ea	2 or more	$16/3	$86/12	$360/72
MX-FX-RX 70-80-85, LX 80-90 (5/16 x 7)	1/2 x 20	$14/2	$36/6	$ 66/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
MX-FX-RX 100-185-288, LO 800 (1/2 x 18) LQ 1500 (1/2 x 14)	1/2 x 30	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
DX 20-35 Carbon Film (Multistrike), OLIVETTI ET-121-221	5/16 x 290	$21/3	$72/12	$414/72	(Call for Correctable Prices)			.....		
NEC Spinwriter-Carbon Film - 2000-3500 (Reloads BCCOMPCO Only)	5/16 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
- 5500-7700 (Can Reload Most Types)	NOT EZ LOAD 1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
-Fabric - 2000-3500 (Can Reload All)	1/2 x 14	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
- 5500-7700 (Can Reload All)	1/2 x 13	$15/2	$42/6	$ 78/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
Pinwriter P1-P2-P8, P-5 (1/2 x 14)	1/2 x 20	$25/2	$69/6	$126/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
P3-P7	1/2 x 27	$30/2	$84/6	$156/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
OKIDATA Pacemark 2350-2410 Black	1/2 x 100		$25 each		$20/1	$18 ea	2 or more	$36/3	$132/12	$720/72
Microline 182-183-192-183 (Call for 292-293 prices)	Inker Loop	$20/2	$57/6	$108/12						
ML-80-82-83-92-93 (Call for ML-84 Prices)	1/2 x 16	$21/6	$36/12	$198/72						
MANNESMAN-TALLY MT-160, RITEMAN INFORUNNER (Inker Loop)	9mm x 11	$19/2	$54/6	$102/12						
MT-180-290	9mm x 13	$20/2	$57/6	$108/12						
-SPIRIT 80 (SP80) COMMODORE 1526 (Multistrike)	1/2 x 35	$16/2	$45/6	$ 84/12						
PANASONIC KXP-1080-1090-1091-1092-1592-1595	Inker Loop	$20/2	$57/6	$108/12						
BROTHER HR-15-25-35 / COMREX CX-15, II — Carbon Film (Multistrike)	5/16 x 82	$18/3	$60/12	$342/72						
BROTHER HR-15-25-35 / COMREX CX-15, II — Fabric (Call for Comrex 420 Prices)	5/16 x 17	$15/2	$42/6	$ 78/12						

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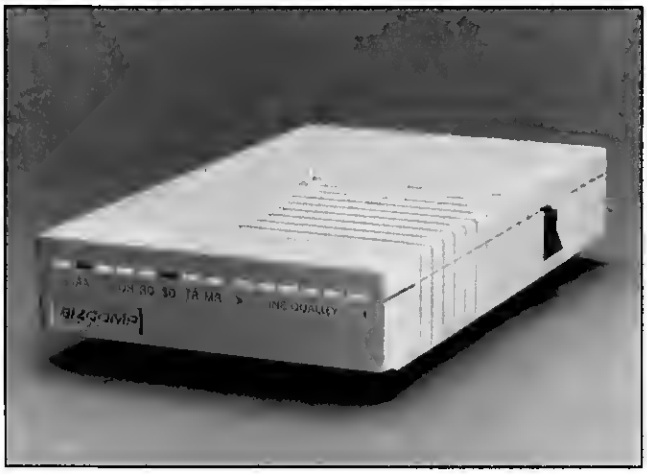


The Intellimodem 2400 is fully Hayes-compatible.

Bizcomp's adaptive echo-canceller technology, which removes echo from the phone lines but retains data clarity when the signal you're receiving is weak.

The Intellimodem 2400 and 2400 PC sell for $599 each and include a telephone network cord, user guide, and two-year limited warranty. For more information contact Bizcomp Corp., 532 Mercury Drive, Sunnyvale, CA 94086, 408-733-7800.

Circle 561 on Reader Service card.

Six Line Filters

PMC Industries' six ac line filters suppress noises from 55–70 dB and high-voltage transients/surges from line to line and line to ground. The units also feature 6-foot shielded line cords (where used), filters enclosed in individual modules, lighted on/off switches, resettable circuit breakers, and multiple filters. Some units have suppression banks of outlets.

Prices for these line filters range from $79.95–$249. They are available from PMC Industries Inc., 6335 Ferris Square, San Diego, CA 92121, 800-242-9353.

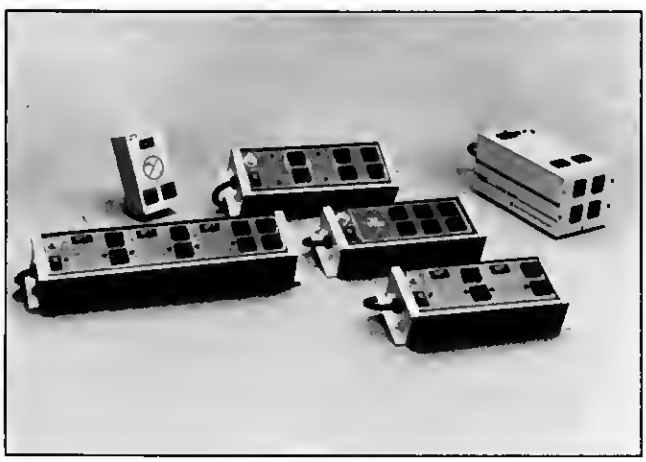
Circle 570 on Reader Service card.

Sidekick

The System Sidekick mounts on the side of your computer work station to hold the system unit vertically and give you more work space. Sidekick's steel frame can be adjusted from 4 to 7 inches and has a textured-putty finish.

It comes with a clamp-mounting system, and screw mounts are available. The System Sidekick sells for $79.95 from Lintek Computer Accessories, 426 North Park NE, Grand Rapids, MI 49505, 800-822-9110.

Circle 565 on Reader Service card.



PMC's ac line filters suppress noises.

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New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

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WP key write-protection.

The WP key is a simple way to write-protect your disks: a plastic strip that you stick into the corner of a 5¼-inch disk to fill the write-protect slot. When you want to remove the protection, just slide the key out—no tearing a sticky tab and scraping off the leftover pieces, no paper tabs lost inside you disk drive, no accidentally damaged disks.

Want to protect the same disk again? Slide the key back in. They're reusable and guaranteed for life. A package of 10 keys sells for $1.39, plus 50 cents for shipping, which covers up to five packages. Write to Near Future Computer Co., P.O. Box 1726, Walla Walla, WA 99362.

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Shhh! Top Secret

The CIA has nothing on *80 Micro* readers (as far as I know). Your cryptography programs represented nearly every cipher known to science. The ones I missed were Bacon's thinking-digital-in-the-17th-century binary cipher and the infamous Nihilist transposition.

Transpositions that mix up plaintext weren't popular at all. Steve Woicik (Turlock, CA) sent the only one, but he gets a bumper sticker anyway for the nicest-looking display.

Naturally, substitution ciphers were well represented. Your favorite method, though, was displacement. In a displacement, you put the characters you want to deal with on a wheel and, to find a character to stand for the original, spin the wheel. The trick is how you spin it. The bravest schemes, which put a different spin on each character, depend on keys, New Math, and purely arbitrary factors like the phases of the moon.

T.J. Reibold's (Superior, WI) big-league math includes multiplication by a matrix. The ciphers you liked best, however, use a key modified by the character's position in the file.

Evan Hand (Loogootee, IN) used two keys for extra security and then each character generated to make a new key for the next (see Program Listing 1). His program demonstrates XOR, another favorite device computers bring to cryptography. XOR helps hide the regularity of mathematical formulas and is naturally reversible, restoring the original the second time you apply the key. Evan also used the Model 4's System command to direct his program's output, as well as CVI and MKI$ to process two characters at a time.

Another cipher fit for a computer uses a "non-repeating key"— a sequence like the one RND produces. Professionals consider it virtually unbreakable, and I hear the KGB likes it.

John Higgins (Davenport, IA) used this device in a nifty one-liner for Color Computers (see Program Listing 2). Color Basic lacks XOR, so John made one out of Not, And, and Or. To restore the plaintext, you must reproduce the random sequence by using the key to "seed" the pseudo-random-number generator. In Color Basic, a negative argument in the RND function plants the seed.

A good cipher considers the medium as well as the method. Gary Clark (Bethesda, MD) pointed out that killing a file deletes it from the directory but leaves it otherwise intact. He wrote over the original file by opening it for sequential input and output at the same time. It works! In random access (the ordinary way to overwrite a file), the unused portion of the last record is dangerous. If it has the simple pattern of a newly formatted disk when you apply your cipher, you leave an obvious clue.

David Gish (Memphis, TN), aware of the trap, had his program (see Program Listing 3) look for the standard end-of-file marker (26) and stop. David also allowed for a long, non-numeric key, on which he used Basic's single-precision notation to apply the high-power math to get a seed for his non-repeating key. Since TRSDOS Basics do not have a function for seeding the RND routine with a predetermined value, David poked the seed directly into low memory. He avoided string manipulation and Model III garbage collection by poking the random-access buffer. Nice job.

Lost and Found

I've lost something in an ordinary text file produced by a no-frills text editor—just everyday text and a few carriage returns. Help me find it. We'll trade T-shirts and bumper stickers for the cleverest search routines. Include any features you've seen in fancy word processors, such as searches by word or character, wild-card searches, search and destroy, and search and replace. Fit your solution into two lines of Basic and have fun.

The Rules:

1. Write your solution(s) in any TRS or Tandy Basic, except Pocket Computer Basic.
2. This month's entries must reach us by May 15, 1987. This doesn't give everyone the same amount of time, we know, and we apologize to our overseas readers especially.
3. This month's winners will appear in the August 1987 issue.
4. Employees of CW Communications are not eligible.
5. Send your entry to: *80 Micro*, Fine Lines, 80 Elm St., Peterborough, NH 03458. We cannot return entries.
6. Specify your T-shirt size. Bumper size not required.■

Harry Bee is a free-lance writer, puzzle creator, programmer, and dreamer. Contact him at P.O. Box 567, Cornish, ME 04020.

Program Listing 1. Evan Hand's doubly keyed Model 4 combination.

```
10 CLS:DEFINT A-Z:L$=CHR$(13):P$="link *do *pr":WHILE S$="" OR D$="" OR (K OR M)
<1 OR (K AND M)=0:INPUT"Source file >";S$:INPUT"Cipher file >";D$:INPUT"Key, Cip
her key (1 - 32767)>";K,M:WEND:INPUT"Copy to printer (Y/N)>";Y$
20 PRINT L$"Processing: "S$:OPEN"D",1,S$,2:FIELD 1,2 AS A$:OPEN"D",2,D$,2:FIELD
2,2 AS B$:WHILE LOC(1)<LOF(1)-1:GET 1:V=CVI(A$):V=V XOR M:M=(V-M) XOR K:LSET B$=
MKI$(V):PUT 2:WEND:CLOSE:N$="reset *do":PRINT L$"Reading: "D$:IF Y$<>"Y" THEN P$
=N$
30 K=0:M=0:WHILE (K OR M)<1 OR (K AND M)=0:INPUT"Key, Cipher key (1 - 32767)>";K
,M:WEND:PRINT:OPEN"D",1,O$,2:FIELD 1,2 AS A$:SYSTEM P$:WHILE NOT(EOF(1)):GET 1:V
=CVI(A$):V=V XOR M:M=((V XOR M)-M) XOR K:PRINT MKI$(V);:WEND:CLOSE:PRINT L$"Done
!";SYSTEM N$
```

Program Listing 2. John Higgins's CoCo cryptographer.

```
0 CLS:INPUT"IN,OUT,KEY";I$,O$,K:C=RND(-ABS(K)):OPEN"D",#1,I$,1:FIELD#1,1 AS A
$:OPEN"O",#2,O$:CLOSE 2:KILL O$:OPEN"D",#2,O$,1:FIELD#2,1 AS B$:FOR I=1 TO LO
F(1):GET#1,I:A=ASC(A$):C=RND(31):LSET B$=CHR$(NOT(AANDC)AND(AORC)):PUT#2,I:PR
INT#D,B$;:NEXT:END
```

Program Listing 3. David Gish's complete cryptographer for the Model III.

```
1 CLEAR500:DEFINTJ-N:CLS:PRINT"CIPHER 1.0":INPUT"File, Key";F$,K$:X=1:J=VARPT
R(X):FORN=1TOLEN(K$):X=X*ASC(MID$(K$,N,1))+N:POKEJ+3,128:NEXT:FORN=0TO2:POKEN
+16554,PEEK(N+J):NEXT:OPEN"RO",1,F$:L=LOF(1):IFL=0,CLOSE:ENDELSEPRINT"Length=
"L"sector"
2 FIELD1,1ASA$:J=VARPTR(A$):J=PEEK(J+1)+256*PEEK(J+2):DEFFNX(A,B)=(AORB)ANDNO
T(AANDB):FORN=1TOL:GET1,N:PRINT@192,"Sector:"N;:FORK=0TO255:M=PEEK(J+K):IFM=2
6THENPUT1,N:CLOSE:ENDELSEM=FNX(M,RND(255)):IFM=26THEN3ELSEPOKEJ+K,M
3 NEXT:PUT1,N:NEXT:CLOSE
```

End

Circle 397 on Reader Service card.

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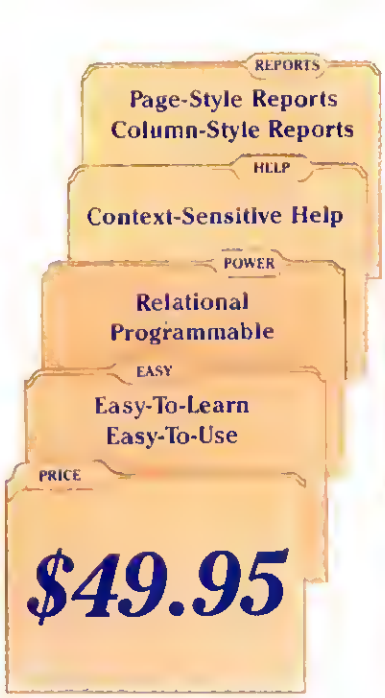
PC Magazine
March 10, 1987



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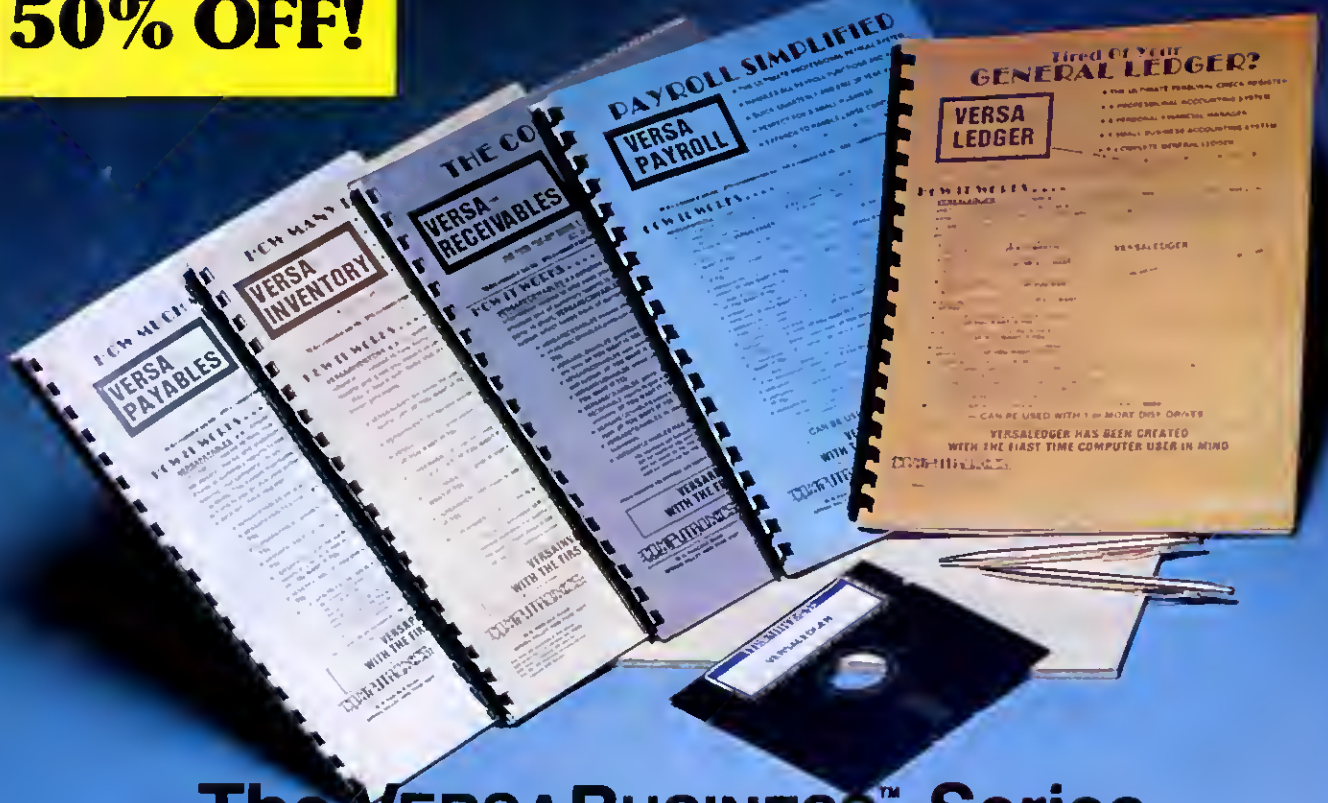

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